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# 1993 Annual Report of the Forest Service



95318

# USDA Forest Service

The Forest Service, U.S. Department of Agriculture, provides leadership in the management, protection, and use of the Nation's forests and rangelands. The agency takes an ecological approach to the implementation of multiple use management, providing sustained yields of renewable resources such as water, forage, wildlife, wood, and recreation. The Forest Service has embraced ecosystem management as its operating philosophy and is committed to the preservation of wilderness, biodiversity, and landscape beauty as well as the protection of the basic resources of soil, water, and air quality.

The Forest Service is responsible for the 191-million-acre National Forest System, with its 156 national forests and 19 grasslands in 44 States, Puerto Rico, and the Virgin Islands. In addition, the agency works with State land management organizations to help private landowners apply good natural resource management practices on their lands. The International Forestry arm of the Forest Service enables the agency to share its technical expertise and managerial skills with other nations. The Research arm of the Forest Service conducts extensive research to enhance and protect productivity on all of America's forests and rangelands, with special attention to long-term natural resource issues of national and international scope.

Key laws guiding Forest Service programs and activities are:

- Multiple-Use Sustained-Yield Act of 1960.
- Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended.
- National Forest Management Act (NFMA) of 1976.
- Forest and Rangeland Renewable Resources Research Act of 1978, as amended.
- Cooperative Forestry Assistance Act of 1978.
- Chief Financial Officer's Act of 1990.
- Food, Agriculture, Conservation, and Trade Act of 1990 (Farm Bill).
- International Forestry Cooperation Act of 1990.
- Government Performance and Results Act of 1993.

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# Report of the Forest Service

Fiscal Year 1993



USDA Forest Service  
Washington, DC

May 1994

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## Selected FY 1993 Statistics

<b>National Forest System</b>	191 Million Acres
Recreation Use	295.5 Million Visitor Days
Trail System	121,059 Miles
National Scenic Byways	6,922 Miles
National Wild and Scenic Rivers System	4,316 Miles Within National Forests
Lands Burned by Wildfire	238,625 Acres
Insect and Disease Suppression	3.1 Million Acres
Wilderness	35 Million Acres
Watershed Improvements	24,119 Acres
Wildlife and Fish Habitat Improvements	202,868 Acres
Reforestation	474,000 Acres
Livestock Grazing	9.8 Million Head Months
Grazing Allotments Administered	9,343 Permits
Mineral Operations Processed	3,800 Plans
Timber Volume Offered	4.6 Billion Board Feet
Timber Harvested	5.9 Billion Board Feet
Road System	369,385 Miles
Landline Boundary System	253,114 Miles
<b>Woodland Owners Assisted</b>	190,256
<b>Research Accomplishments</b>	>2,500 (Includes books, papers, articles, reports, audio-visual materials, and other documents.)
<b>Human Resource Programs</b>	135,556 Persons Served

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## Secretary's Message



In the spirit of Team USDA and the spirit of cooperation stressed by the Clinton administration, the Forest Service has worked to improve interagency communication and coordination to fulfill its land stewardship and public service mission.

Widespread implementation of ecosystem management within all activities of the Forest Service was a major priority in FY 1993. In national forests across the United States, the Forest Service is incorporating ecosystem management principles. The Forest Service took significant steps in developing a national ecological classification system, which will provide the organizational framework for information about ecosystems and facilitate implementation of the ecosystem management approach.

Working in partnership with the other Federal agencies, the Forest Service is formulating the President's Forest Plan for a Sustainable Economy and a Sustainable Environment in the Pacific Northwest and Northern California. The Forest Service is leading the change in land and resource management strategies on national forests and other Federal lands in the region to balance sound conservation considerations with economic concerns.

The Forest Service started streamlining its operations in 1993 in response to my call for a new USDA. With its numerous field offices, the Forest Service will play a critical role in coordinating field office consolidation and improving the efficiency of administrative operations in the Washington, DC, headquarters.

Forest Service employees exemplify the spirit of the "people's department" as they help citizens enjoy the Nation's natural resource treasures and act as steward of those resources. In 1993, the Forest Service demonstrated its commitment to improving its care for the land and service delivery to Americans. In the years ahead, the Forest Service will continue to help USDA reinvent itself so that it can better fulfill the diverse missions of the "people's department."

With new thinking and new management led by Chief Jack Ward Thomas, I expect 1994 to be an outstanding year of both service and stewardship for the Forest Service.

A handwritten signature in cursive script that reads "Mike Espy". The signature is written in dark ink and is positioned above the printed name and title.

Mike Espy  
Secretary



## Chief's Message



The values Americans place on the natural world are changing dramatically. The Forest Service has been responding to these changes, but more, much more, remains to be done and changes lie ahead. The American people want us to expand our commitment to the sustenance of these resources, improve accountability for our actions, and respond to the desires and needs of our customers, the American people. They expect healthy and productive wildlife, enhanced recreation resources and opportunities, as well as the sustained production of goods and services. They also demand more effective, efficient, and responsive Government at reduced cost.

This climate of change offers unprecedented opportunities and challenges. It invites discarding outmoded procedures, building on past successes, and pursuing new strategies. It encourages us to boldly enhance our role as national and international leaders in sustainable forestry and to embrace new approaches to forest stewardship.

The Forest Service's Mission, Vision, and Guiding Principles published in March 1993 describe an idealistic vision of our organization and a set of institutional values. But I believe these principles embody direction, policy, and philosophy that, when followed, will improve the chances to sustain healthy and productive ecosystems.

I am proud of our commitment to the land, the resources, and the American people. I am confident that our constantly improving ability to work in partnership with the international community, other government agencies, citizens' groups, commodity interests, and the environmental community will provide long-term benefits. We face more disagreement over how public lands and resources should be managed than at any time since Gifford Pinchot was Chief. Yet, our ability to synthesize science, research, and new technologies offers an enhanced view of the land's capabilities and the means for the next step along the path of conservation that we have pursued since 1905.

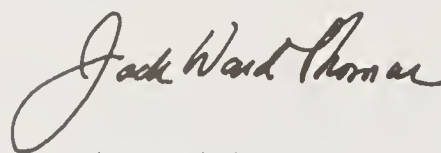
Through the first steps of applying principles of ecosystem management, we continue steady progress toward attaining the multiple-use management objectives that guide us. We have established classification and mapping systems that provide the ecological basis to exchange data and information within our agency. That data and technology will be available to our Federal, State, and private resource management partners. The President's Forest Plan for a Sustainable Economy and a Sustainable Environment in the Pacific Northwest and Northern California provides direction for long-term sustainability of forest resources in that region. It demonstrates that applying scientific expertise to difficult policy issues can lead to creative solutions for problems previously deemed unsolvable.

Increasing the application of science in natural resource management decisions is critical to progress in developing and implementing ecosystem management. Our research program remains focused on providing basic scientific and technical knowledge that will improve the productivity, health, and diversity of forest and rangeland ecosystems. We can enhance our on-the-ground application of this knowledge through constant reinvestment in the technical expertise of our resource professionals. The dedication this past summer of the Aldo Leopold Wilderness Research Institute and Arthur Carhart National Wilderness Training Center illustrates the commitment to train resource managers and to facilitate the integration of science, policy, and management across organizational and internal agency boundaries.

The agency's commitment to sustainable forest management provides opportunities to demonstrate leadership in international forest resource conservation and to use our increasingly effective stewardship as a worthy standard for forest management around the world. The International Forestry Program continues to foster partnerships, such as the recently convened forum of "community of interests," to share information, develop strategies, and tailor approaches to address international forestry issues.

The Forest Service is increasingly committed to collaborative planning, community involvement, and citizen participation in resource management. The Forest Stewardship and Community Assistance Programs are aimed at developing a new spirit of Government and citizen cooperation where it counts most—where we live and work together.

In the years ahead, commitment to leadership and change will afford myriad opportunities to meet the goal of sustaining the resources of our Nation's forests and grasslands. I invite you to work with the Forest Service's dedicated employees to set a new course in fulfilling our charter to care for the land and serve people.

A handwritten signature in black ink that reads "Jack Ward Thomas". The signature is fluid and cursive, with the first letters of each word being capitalized and prominent.

Jack Ward Thomas  
Chief

# Overview

To comply with the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, the Secretary of Agriculture submits an annual report to Congress. This report summarizes the performance of the Forest Service in implementing the 1990 RPA Program ("The Forest Service Program for Forest and Rangeland Resources: A Long-Term Strategic Plan") in response to congressional direction and appropriations for FY 1993. In this report, results of management, fiscal information, and highlights of Forest Service programs during FY 1993 are presented.

## ***Mission, Vision, Guiding Principles***

**... blending the diverse needs of people with quality stewardship of natural resources.**

The Forest Service tradition of national leadership in natural resource conservation, management, and research is embodied in the motto "Caring for the Land and Serving People." However, global concerns over sustainability of natural resources, constant changes in public values and preferences for natural resource management, as well as changes in work force composition have increased the need for a more comprehensive framework to guide the agency into the next century. After more than 2 years in the development process, the Forest Service Mission, Vision, and Guiding Principles were released in March 1993. These principles enhance the motto to reflect a broader reference to the roles the agency assumes in blending the diverse needs of people with quality stewardship of natural resources.

## ***Resource Management Programs***

**... integration of five resource programs:**

Forest Service missions are achieved through the integration of five resource programs: (1) management of the National Forest System, (2) assistance to State, private, and other Federal landowners, (3) scientific research, (4) international forestry cooperation, and (5) human resources.

The National Forest System comprises 191 million acres of public land which include national forests, national grasslands, land utilization projects, and other selected lands and waters. These lands are managed in compliance with the Multiple-Use Sustained-Yield Act of 1960, the RPA of 1974, as amended, and the National Forest Management Act (NFMA) of 1976, which emphasizes management of natural resources to best meet the needs of the American people without impairing the productivity of the land.

**... ecological approach to the implementation of multiple-use management.**

During FY 1993, the Forest Service actively pursued an ecological approach to the implementation of multiple-use management activities as the most important management policy for natural resource management of the national forests and grasslands. Results of implementation are evident in the higher emphasis being placed on protection and restoration of resource conditions. Embracing ecosystem management and ensuring environmentally acceptable commodity production as a working philosophy is being emphasized in research seminars, forest and grassland field activities, regional conferences, and nationwide symposia. Managers are focusing on a wide range of demonstrations and applications including forest health maintenance, management of riparian ecosystems, economic support to communities, restoration of natural processes, and integrated data collection using state-of-the-art technology. Focal points include ecological trends and how ecosystems are affected by natural disturbances and human interactions with ecosystems. Four principal guiding areas include: (1) ecological approach, (2) partnerships, (3) participation, and (4) scientific knowledge.

**Partnerships with public and private entities...**

Technical and financial cooperation with, and assistance to, State, local, and private landowners in managing, protecting, and using non-Federal forest resources are coordinated through State and Private Forestry programs. Partnerships, with a wide variety of public and private entities, help direct assistance to other Federal, State, and local agencies, State foresters, Native Americans, private landowners, and the international community. Forest pest management and fire management assistance are also provided to resource managers of all land ownerships, including the National Forest System.



## **Benefits from research extend beyond National Forest System ...**

Forest Service research programs provide the scientific foundation for sustainable forest development and improve the agency's ability to ensure the health, diversity, and productivity of forest and grassland ecosystems. Benefits from research extend beyond National Forest System boundaries to other public and private land managers and to other regions of the world through technical assistance and technology transfer programs.

## **... global natural resource policies.**

The Forest Service, in partnership with other nations and organizations, fosters global natural resource conservation and sustainable development of the world's forest resources. International forestry activities include sharing and exchanging research and technical knowledge with other countries, assisting in natural disasters abroad, supporting international forestry organizations, and developing global natural resource policies.

The Forest Service employs a professional and diverse permanent work force and hosts a number of special human resource programs that employ, train, or educate specific groups of people. These programs are integrated into all agency activities and accomplish high-priority conservation work.

## ***Ecosystem Management***

## **Ecosystem management...the operating philosophy of the Forest Service.**

Ecosystem management has been embraced as the operating philosophy of the Forest Service. This approach ensures that stewardship of lands and resources is accomplished in an environmentally sensitive, socially responsive, and scientifically sound manner. It enables resource managers to view natural resources from a landscape or whole system perspective. It integrates the human, biological, and physical dimensions of natural resource management to promote healthy, productive, and sustainable forest and rangeland ecosystems.

## **...the human dimension of ecosystem management.**

Using an ecological approach to guide management of the Nation's forests and grasslands is an important step in integrating the Mission, Vision, and Guiding Principles into agency operations. Ecosystem management provides the framework and tools necessary for the agency to evolve with its program direction. For example, tracking the human dimension of ecosystem management provides the feedback necessary for the agency to respond effectively to society's diverse and changing values, and subsequently to renew or revitalize its own mission.

## **Hierarchical ecosystem mapping and classification system...**

The Forest Service has made some important progress during FY 1993 in defining and implementing the concepts of ecosystem management across the full spectrum of agency programs. Accomplishments included the development of an hierarchical ecosystem mapping and classification system, the completion of some major regional ecosystem assessments, and numerous pilot and demonstration projects.

## **...incorporation of ecosystem management knowledge into on-the-ground management.**

Because of its complexity, ecosystem management requires an accelerated scientific effort and the efficient incorporation of that knowledge into on-the-ground management. In response, Forest Service research has committed to the "Strategies for the 90's" research plan. This plan endorses a research program focused on developing knowledge and solving problems in: (1) understanding ecosystems, (2) understanding relationships between people and natural resources, and (3) understanding and expanding resource options. State and Private Forestry began communicating the benefits of applying ecosystem management principles across multiple ownerships in conjunction with its voluntary partnerships with nonindustrial private forest landowners. International Forestry has been actively participating, in cooperation with other organizations and countries, in defining and promoting sustainable management of forest resources. International Forestry also has been involved in preliminary efforts to develop indicators of sustainability. An important factor in successful implementation of ecosystem management is the ability to define, measure, and monitor sustainability of forest ecosystems.



## ***The 1990 Forest Service Program for Forest and Rangeland Resources: A Long-Term RPA (Resources Planning Act) Strategic Plan***

The Forest Service's national strategic plan, the 1990 RPA Program, outlines the agency's long-term strategic direction and provides general policy guidance through 1994. The resource vision for the agency is set forth in the RPA Program and is integrated into all lower level planning. The RPA Program is updated at 5-year intervals and provides strategic direction for a 50-year planning horizon. The 1990 Program defined the major policy roles of the Forest Service and analyzed its relationship with and responses to contemporary issues. From these roles and issues, four major themes emerged which have guided Forest Service actions and policies since 1990. The four themes are:

- Recreation, wildlife, and fisheries resource enhancement;
- Environmentally acceptable commodity production;
- Improved scientific knowledge about natural resources; and
- Responding to global resource issues.

### **Measures of agency performance...**

These themes are important to the evaluation of Forest Service performance in FY 1993 and are used in this chapter as a framework to report actions which fulfill the long-term strategic direction of the agency. Figure 1 displays selected measures of agency performance for FY 1993 along with FY 1992 information for comparison purposes.

### **... to increase compatibility among multiple uses.**

#### **Recreation, Wildlife, and Fisheries Resource Enhancement**

The Forest Service continues to emphasize enhancing the production of recreation, wildlife, and fisheries outputs on National Forest System lands and enhancing these resources on State and private forest lands through technical and financial assistance. Research continues seeking ways to increase compatibility among multiple uses. Forest Service programs in recreation focus special attention on increasing the quality of recreation opportunities. The agency plays a major role in restoring, protecting, and improving habitat for various plant, wildlife, and fish species.

### **...295.5 million recreation visitor days; 18,000 facilities.**

Outdoor recreation use on National Forest System lands reached 295.5 million recreation visitor days (RVD) in FY 1993 (see figure 2). (A recreation visitor day is 12 hours of visitation by one or more persons.) This represents a 2.7-percent increase over recreation use reported for FY 1992 and is 96 percent of the total RVD's projected for FY 1995 in the 1990 RPA Program. National Forest System lands can accommodate 1.8 million people at one time (PAOT) at over 18,000 facilities, which include campgrounds, trailheads, boat ramps, picnic areas, visitor information centers, and ski resorts. (PAOT's are calculated by multiplying a site's design capacity by the number of days per year that the site is open for public use.) In FY 1993, the Forest Service operated and maintained facilities with a yearly capacity of 144.1 million PAOT days. Twenty percent of the National Forest campground capacity is managed under special-use permit.

### **...34.6 million acres of wilderness. ●**

The Wilderness Preservation System plays an important role in protecting fragile ecosystems and in preserving natural resources for scientific, educational, and historic values. In FY 1993, the Forest Service coordinated dedication of the interagency Arthur Carhart National Wilderness Training Center and the Aldo Leopold Wilderness Research Institute in Missoula, Montana. Establishment of these two centers demonstrated a commitment to improved wilderness management through integration of science, policy, and management across organizational and agency boundaries. With the addition of 553,203 acres, the Wilderness Preservation System within the National Forest System expanded to 34.6 million acres in FY 1993.

Figure 1.

## MEASURES OF PERFORMANCE

	Accomplishments	
	1993	1992
<b>NATIONAL FOREST SYSTEM</b>		
Miles of road constructed.....	816	1,180
Miles of road reconstructed.....	2,625	3,259
Acres of land purchased.....	115,731	157,018
Acres of land exchanged.....	81,956	69,102
Number of rights-of-way easements acquired or resolved.....	729	657
Plans of mineral operation processed 1/.....	3,800	3,565
Head months permitted to graze (millions) .....	9.8	9.4 2/
Acres meeting or moving toward forest plan objectives for rangeland ecosystems (millions) 1/.....	47.5 3/	NA
Recreation capacity maintained (million PAOT-days) 1/.....	144.1	135.8
Trail miles maintained (thousands) 1/.....	71.2	69.8
Timber volume offered (billion board feet) 1/.....	4.6	5.1
Timber volume harvested (billion board feet).....	5.9	7.3
Acres reforested (plant/seed/site prep.) (thousands).....	474	492
Acres of timber stand improvement (release/thin/etc.) (thousands).....	344	354.8
Acres of watershed improvements (thousands) 1/.....	24.1	26.4
Wildlife & fish structures completed (thousands) 1/.....	18.2	19.9
Acres of wildlife & fish improvements (thousands) 1/.....	203	243
<b>STATE &amp; PRIVATE FORESTRY</b>		
Acres of pest suppression activities completed (millions) 1/.....	3.1	1.7
Acres under stewardship management (millions) 1/.....	2.6	1.7
Acres of Federal/State rural tree planting (thousands) 1/.....	668	678
Acres of National Forest System lands treated for fuels management (thousands) 1/.....	385	285
<b>RESEARCH</b>		
Research accomplishments in the following major subject areas:	>2,500 4/	>2,600 4/
Environmental		
Insect and disease		
Fire and atmospheric sciences		
Forest management		
Economics, marketing, and recreation		
Products and engineering		
Miscellaneous		
<b>INTERNATIONAL FORESTRY</b>		
Person years of international technical assistance 1/.....	207	NA 5/
Person years of international training 1/.....	552	NA 5/
Person years of cooperative research/scientific exchange 1/.....	69	NA 5/
<b>ADMINISTRATION</b>		
Percent of total Forest Service payments incurring late payment interest penalties....	1.7	2.1
Work force profile:		
Men		
African American.....	693	690
American Indian/Alaskan Native.....	945	973
Asian/Pacific Islanders.....	247	243
Hispanic.....	1,152	1,187
White.....	18,058	18,680
Women		
African American.....	778	797
American Indian/Alaskan Native.....	672	693
Asian/Pacific Islanders.....	262	269
Hispanic.....	665	668
White.....	11,470	11,937
Total, permanent and excepted employees.....	34,942	36,137

1/ Measure is estimated or qualified.

2/ Calendar year data (animal unit months).

3/ Includes 25.4 million acres meeting forest plan objectives and 22.1 million acres moving toward forest plan objectives.

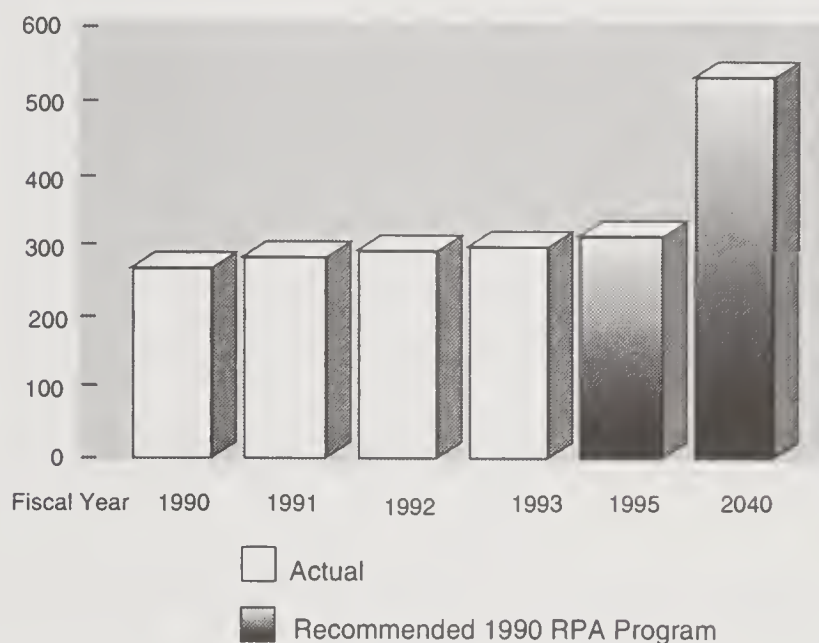
4/ Includes books, papers, articles, reports, audio-visual materials, and other documents.

5/ Information not available.

Figure 2.

**Recreation Use, Including Wildlife and Fish**

Million Recreation Visitor Days (RVD's)

**...121,059 miles of trails.**

A total of 71,152 miles of trails were maintained on National Forest System lands in FY 1993. The total trail system contains 121,059 miles. Properly maintained trail systems provided opportunities for high-quality recreational experiences and minimized adverse impacts on recreation resources.

**More than 1,300 volunteers in the Heritage Program.**

Public awareness regarding use of cultural resource sites increased this past year. Inventory, protection, and enhancement of significant historic and archaeological sites on national forests are coordinated through the Heritage Program. During FY 1993, over 1,300 volunteers contributed approximately 51,000 hours to 92 "Passport In Time" (PIT) projects that included archaeological excavation, historic reconstruction, oral history collection, survey, monitoring, and restoration. PIT projects took place on 66 National Forests in 8 out of the 9 Regions and in 27 States.

**...4,316 miles of wild and scenic rivers; 120 national scenic byways covering nearly 6,922 miles.**

The national forests provide unique opportunities for a wide spectrum of recreation activities in a variety of settings. Two examples are the Wild and Scenic Rivers Program and the National Scenic Byways Program. The National Wild and Scenic Rivers Program encompasses 10,410 miles. The Forest Service manages 4,316 of those miles. Wildlife, fish, and recreation opportunities are enhanced through protection of the freeflowing characteristics of designated river segments. The National Scenic Byways Program identifies scenic travel routes having outstanding aesthetic, cultural, and historical values. The Forest Service designated its first national forest scenic byway in 1988. The program has grown to 120 national scenic byways within National Forest System lands in FY 1993, covering nearly 6,922 miles in 34 States. Eleven scenic byways were nominated in FY 1993; 9 of the 11 were added to the National Forest Scenic Byways Program.

**...habitats for one-third of the federally listed threatened and endangered species; 2,200 sensitive species.**

The Forest Service manages important habitats for approximately one-third of the federally listed threatened and endangered species. Continued pressure on Federal lands for protection of diverse habitats is expected as private land continues to be developed. Partnerships with private organizations and other State and Federal agencies are coordinated through the "Every Species Counts" program, designed to recover and conserve rare species. Forest Service management activities contributed to the reclassification of two endangered species in FY 1993. The old-arlane's four o'clock (*Mirabilis macfarlanei*), a perennial with large magenta flowers, was proposed for downlisting to threatened



### **Aquatic habitat restoration and management...**

### **Habitat improvement projects on 202,868 acres...**

**...16,982 acres of inland fish habitat improvements and 4,928 fisheries habitat improvement structures; 6,012 acres and 4,116 structures for anadromous fish.**

status. The Louisiana pearlshell (*Margaritifera hembeli*), a freshwater mussel, was reclassified to threatened status. In FY 1993, efforts were made to identify and manage 2,200 sensitive species on forest and grassland ecosystems to prevent the need for costly and restrictive Federal listing.

Maintenance of high-quality natural habitats in lakes, streams, and rivers is critical to the health and survival of native fish and aquatic species such as mussels, snails, and aquatic insects. Aquatic habitat restoration and management on National Forest System lands are coordinated under the "Rise to the Future" fisheries program. Interpretive and educational events for forest visitors play an important role in communicating the value of aquatic ecology research and habitat management in maintaining healthy, productive aquatic ecosystems. In cooperation with many public and private partners, the Forest Service hosted over 300 events as part of the 1993 National Fishing Week. This initiative has promoted the importance of family outdoor activities. It also demonstrates the agency's commitment to sport and recreational fishing.

In FY 1993, habitat restoration and enhancement projects for wildlife, fish, and rare plants were completed on 202,868 acres. The Forest Service also built 18,192 habitat improvement structures such as nesting boxes and watering devices. Watershed improvement projects were completed on 24,119 acres through revegetation, soil stabilization, and stream channel rehabilitation efforts. Nearly 8 million acres of wildlife, fish, and threatened, endangered, and sensitive species inventory were completed.

In FY 1993, the Forest Service accomplished 16,982 acres of inland fish habitat improvements and 4,928 fisheries habitat improvement structures with protection and maintenance funds. Improvement of anadromous fish habitat was accomplished on 6,012 acres and a total of 4,116 anadromous fish habitat improvement structures were completed. This represents 84 percent of the total number of habitat improvement structures projected for FY 1995 in the 1990 RPA Program.



### **PACFISH--a common strategy to enhance Pacific anadromous fish habitats.**

In March 1993, the Forest Service and the Bureau of Land Management (BLM) announced their commitment to developing a common strategy that would address declining populations of Pacific anadromous fish (PACFISH). The PACFISH strategy, developed cooperatively by watershed and fisheries research scientists, forest managers, and fisheries biologists, is concerned with maintaining or restoring healthy, functioning watersheds, riparian areas, and associated fish habitats. This is reflected by easily quantifiable habitat features that are good indicators of system health such as pool frequency, water



temperature, woody debris, streambank stability and lower bank angle, and width-to-depth ratio. PACFISH is an interagency effort to provide habitat conditions on Forest Service and BLM administered lands that contribute to the recovery and sustained natural production of Pacific salmon, steelhead, and sea-run cutthroat trout.

**Acquired 115,731 acres of critical lands.**

The Forest Service land acquisition program purchases tracts of land identified as important for recreation opportunities, conservation of threatened or endangered species habitat, protection of significant cultural resources, acquisition of wetland and riparian areas, or protection of rare ecological areas. In FY 1993, the Forest Service acquired 115,731 acres of lands, including nationally significant areas such as the Glen House Tract in the White Mountains of New Hampshire and Hope Valley in California.

**...reduced 820 miles of property boundaries, saving an estimated \$4.5 million in landline location costs.**

Land exchange involves the voluntary conveyance of National Forest System lands for an equal fair market value of non-Federal lands. In FY 1993, the Forest Service acquired 81,956 acres of non-Federal land. The exchanges often are promoted to protect critical resources from adverse development, or to consolidate scattered parcels of National Forest System or congressionally designated lands. In FY 1993, the land exchange program reduced national forest property boundaries by 820 miles, saving an estimated \$4.5 million in landline location costs.

**...729 right-of-way cases were resolved.**

A total of 729 right-of-way cases were resolved in FY 1993, compared to 657 cases in FY 1992. The rights-of-way acquisition program allows access needs to be met by: (1) acquiring right-of-way easements, (2) eliminating the need for rights-of-way by completing landownership adjustments, such as land purchases or exchanges, or (3) assisting in validating the outstanding public status of rights-of-way through cooperative efforts with State and local government agencies and others.

**Environmentally Acceptable Commodity Production**

The level of commodity production on National Forest System lands has been adjusted downward where commodity production cannot be accomplished in an environmentally acceptable manner. The Forest Service has emphasized this sensitivity when providing assistance to State and private landowners. In addition, Forest Service research programs have developed new techniques and knowledge to protect the environment while fulfilling the agency's mandate of multiple-use management. Agencywide commitment to an ecological approach to multiple resource management provides the strong framework for environmentally sensitive commodity production.

**Reforested 474,000 acres and conducted timber stand improvement treatments on 344,000 acres.**

Reforestation and timber stand improvement are essential practices to rehabilitate and support healthy, sustainable forest ecosystems. In FY 1993, the Forest Service reforested 474,000 acres of National Forest System lands. Timber stand improvement treatments were accomplished on 344,000 acres.

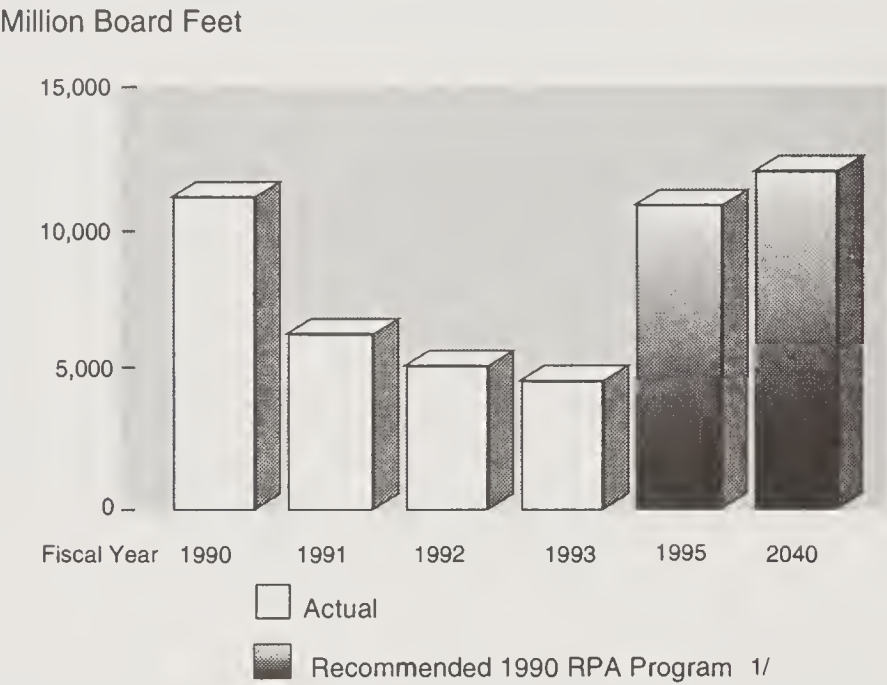
Timber production on National Forest System lands declined in FY 1993. The 1990 RPA Program ("The Forest Service Program for Forest and Rangeland Resources: A Long-Term Strategic Plan") projections did not account for as much of a reduction in timber offers as resulted from increased protection of threatened and endangered species habitat, such as northern spotted owl and red-cockaded woodpecker, and increased protection of old-growth forests and watersheds.

**Timber offered was 10 percent below FY 1992.**

The total timber offered for sale in FY 1993 was 4.6 billion board feet (figure 3). This was almost 10 percent below the levels offered in FY 1992, and represents the third straight year the volume offered has declined. The timber volume harvested was 5.9 billion board feet, a 19 percent reduction from FY 1992.

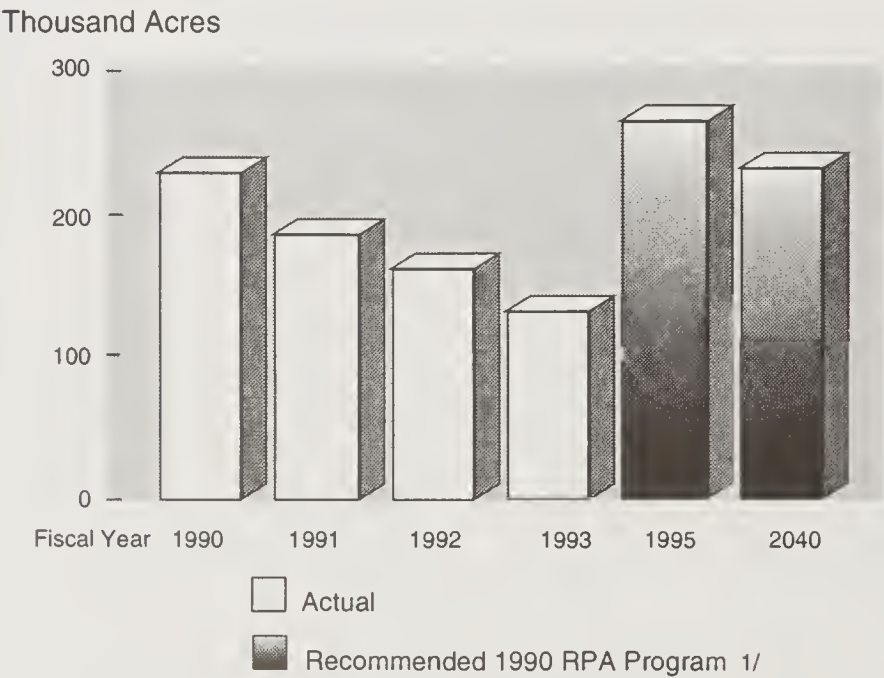
In FY 1993, the Forest Service remained committed to reducing the use of clearcutting as a standard commercial timber harvest practice on the national forests. Clearcut acres and the percentage of total harvest from clearcutting continued to decline from historic highs

Figure 3.  
Total Timber Offered



1/ Since completion of the 1990 RPA Program, increased protection of threatened and endangered species such as the northern spotted owl and the red-cockaded woodpecker, and increased protection of old-growth and watersheds, have resulted in less timber offered than proposed in the 1990 RPA Program.

Figure 4.  
Clearcut Harvests



1/ Since completion of the 1990 RPA Program, clearcut acreage has declined both as a result of reductions in total timber harvest acreage and more rapid shifting away from clearcutting as a standard commercial harvest method.

**Clearcutting is declining faster than proposed in the 1990 RPA Program.**

in the 1980's. In FY 1993, a total of 732,463 acres were harvested. Figure 4 shows clearcutting totals for FY 1993 of 132,674 acres, representing 18.1 percent of the total harvest acres. This percentage clearcut is down from the 21.5 percent of total harvest acres reported for FY 1992. This is an even faster decline in the percentage clearcut than proposed in the 1990 RPA Program.

**Road construction declined for the third consecutive year, mainly due to the decline of timber harvested.**

In FY 1993, a total of 2,625 miles of existing forest development roads were reconstructed, 160 miles more than planned for. This is a decrease from FY 1992, when 3,259 miles were reconstructed. During FY 1993, the Forest Service constructed 816 miles of new road, 156 miles less than planned for the year. This is the third consecutive year that miles of new road construction have decreased. This decrease is mainly due to the decline in the amount of timber harvested. In FY 1993, 2,133 miles of road which were no longer needed in managing the national forests were obliterated, and the land was restored for vegetation.

Conserving, restoring, and sustaining the long-term health of rangeland ecosystems is an important objective of the Forest Service's range management program. Rangeland resources are managed for a variety of outputs, including the provision of habitat and forage for wildlife and grazing for domestic livestock. Federal agencies, in partnership with wildlife and livestock organizations, have continued evaluation of the interaction between big game and domestic livestock. Through the "Seeking Common Ground" effort, nine demonstration projects were funded in FY 1993 to explore these interactions.

**"Change on the Range" philosophy...**

As part of the continuing "Change on the Range" philosophy, measures on acres suitable for livestock grazing have been replaced with measures reflecting the condition of the total rangeland ecosystem. The objectives for range vegetation in the forest plans are to maintain or restore healthy upland and riparian ecosystems and to maintain multiple resource values. Forest plan standards and guidelines that have been established to achieve these objectives provide specific minimum requirements for maintaining or improving various ecosystem components. These standards and guidelines focus primarily on the 97 million acres in 33 States where grazing is authorized by permit. Of these, 74.3 million acres have range vegetation management objectives in the forest plans. Following applicable forest plan standards and guidelines, forest plan range vegetation resource objectives were achieved on 25.4 million of the 74.3 million acres, largely through management of livestock. An additional 22.1 million of the 74.3 million acres were moved towards meeting forest plan objectives.

**Installed 3,288 range improvement structures...**

In FY 1993, the Forest Service administered 9,343 paid permits for 9.8 million head months (HM's) of permitted grazing by domestic livestock. Also, a total of 3,288 structural range improvements, such as fences and water developments, were installed to improve management of livestock on forest lands.

**...12,000 private mineral operations; 7,000 active mines.**

The Forest Service administers energy and minerals resource exploration, development, and production from National Forest System lands. The Forest Service currently monitors and inspects approximately 12,000 private mineral operations each year, primarily involving oil and gas wells. Approximately 3 million acres in national forests were leased in FY 1993. The Forest Service processed about 3,800 proposals to conduct mineral operations. There were an estimated 7,000 active mines within national forests during FY 1993.

**Produced minerals valued at \$4 billion; raised over \$200 million for the Treasury.**

During FY 1993, national forests produced 10.5 million barrels of oil, 210 billion cubic feet of gas, 90 million tons of coal (the two largest coal mines in the country are within national forests), 95 percent of domestic lead output, and over 5.5 million tons of phosphate. The value of minerals produced from national forests in FY 1993 is estimated at \$4 billion. Mineral production also raised over \$200 million in revenues for the Treasury.



**About 25,000 unreclaimed mine sites...**

Extraction of locatable and leasable minerals is subject to surface management regulation and statutory requirements of the National Environmental Policy Act (NEPA), the Clean Water Act, and the Endangered Species Act. In FY 1993, the agency estimated that 25,000 abandoned and unreclaimed mine sites are located on lands administered by the Forest Service. Most of these sites were worked prior to passage of environmental legislation. To minimize potentially adverse effects on the environment, efforts were made in FY 1993 to inventory inactive sites and to prioritize reclamation and hazard removal efforts.

**Fuels reduction in more than 385,000 acres; pest prevention and suppression on 3.1 million acres.**

Protecting forest resources from damaging wildfires and forest pests is an essential component of forest management. In FY 1993, more than 385,000 acres of National Forest System lands were treated to reduce fire hazard, about 100,000 acres more than in FY 1992. Pest prevention and suppression activities protecting 3.1 million acres of forested Federal and cooperative lands from gypsy moths, southern pine beetles, dwarf mistletoe, and other insects and diseases were carried out in FY 1993.

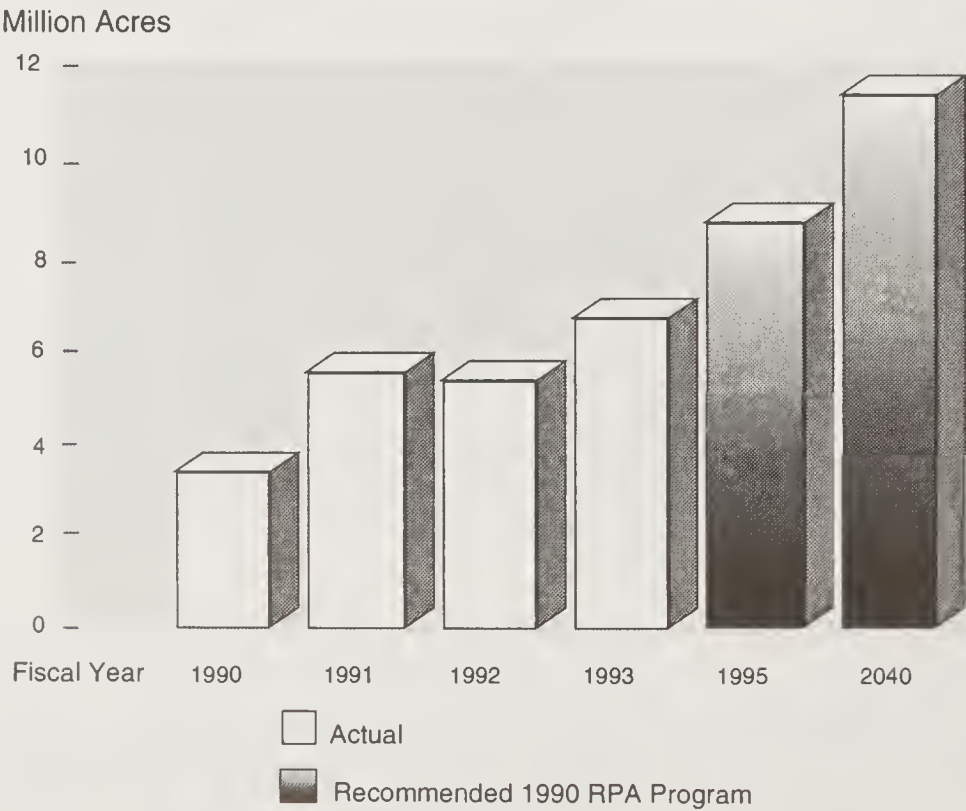
**Assistance provided to develop multiresource management plans on 6.9 million acres of nonindustrial private forests.**

Multiple-resource planning and stewardship assistance to State and private forest owners emphasizes environmentally sensitive commodity production. Ecosystem management offers a broad framework from which sound ecological management principles can be communicated to nonindustrial private forest (NIPF) landowners. Through programs encouraging voluntary partnerships, such as the Forest Stewardship Program, the Forest Service is providing assistance across multiple ownerships to manage in an ecologically responsible way. In FY 1993, assistance to NIPF landowners through Federal/State cooperation led to the development of multiresource management plans on 6.9 million acres (figure 5). Total reforestation (planting, seeding and natural regeneration) on NIPF lands reached about 1 million acres in FY 1993 (figure 6).

**A total of 6,276,696 acres under stewardship management; assisted in the reforestation of 667,999 acres.**

The total land under stewardship management in FY 1993 was 2,615,645 acres, almost a million acres more than in FY 1992. The cumulative total under this program since FY 1990 is 6,276,696 acres. This represents the nonindustrial private lands placed under

Figure 5.  
**State and Private Forestry Multiresource Plans 1/**



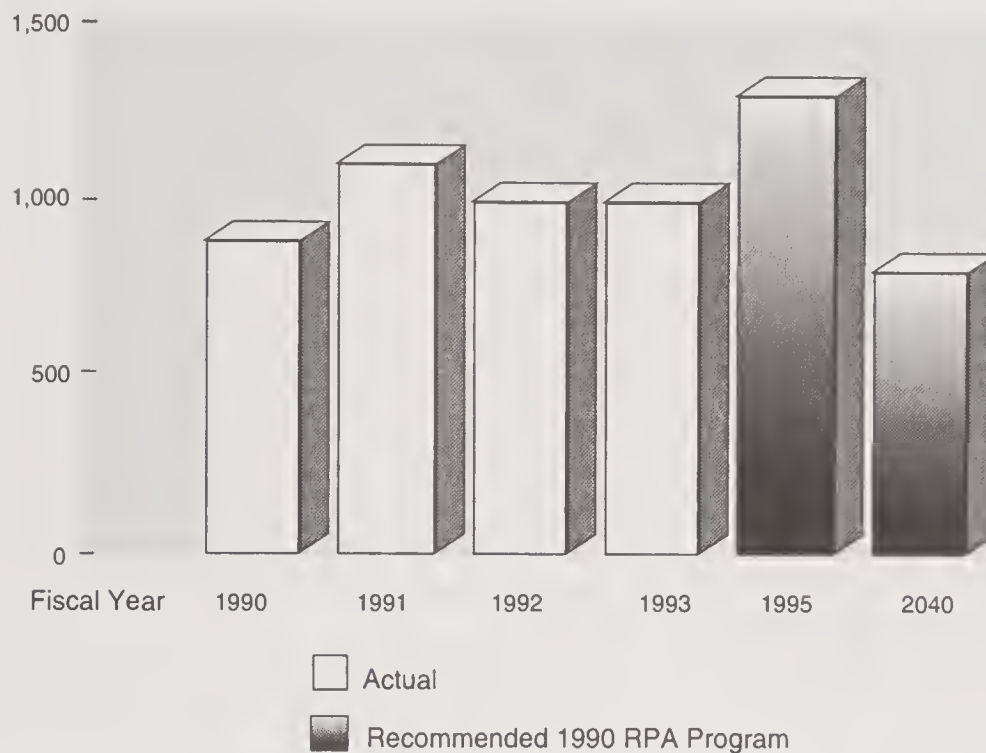
1/ Includes acres funded by forest resource management and stewardship.



Figure 6.

### Total Reforestation on Nonindustrial Private Forest (NIPF) Lands and Projected Accomplishments with S&PF Assistance

Thousand Acres



sustained multiple-use management plans (Forest Stewardship Program) by the end of FY 1993. Federal/State rural tree planting was accomplished on 667,999 acres in FY 1993, about the same acreage as in FY 1992.

#### Environmentally sound timber harvesting video.

Scientists at the Fernow Experimental Forest produced a video to teach the importance of using best management practices (BMP's) and how to implement them. This video contains practical information covering all the various steps necessary to conduct a successful, environmentally sound timber harvesting operation. The information in the video is applicable to most of the Eastern United States.

#### Improved Scientific Knowledge About Natural Resources

During FY 1993, the Forest Service continued expansion of its research efforts to enhance the compatibility of competing resources. Research was increased to study the complex interactions of forest and rangeland ecosystems, an understanding essential to expanding resource production opportunities while protecting the environmental integrity of the resource base.

#### Habitat conservation assessments for anadromous and inland fish.

As the Forest Service embraces ecosystem management, it is approaching issues in a broader landscape context. Habitat Conservation Assessments (HCA's) are being prepared on a variety of species, including Pacific salmon and steelhead, small carnivores (fisher, pine marten, lynx and wolverine), marbled murrelet, bull trout, northern goshawk, forest owls (great gray, flammulated, and boreal), and inland cutthroat trout. Numerous cooperators also have been working in partnership with Forest Service experts on the assessment teams.

#### Forest health monitoring...

The Forest Health Monitoring Program provides information on how forest pests, air pollution, climate variation, and forest management methods interact to affect the overall health of forest ecosystems. When fully implemented, the program will blend data from intensive site-specific monitoring with broad regional and national information to provide

a comprehensive assessment of forest conditions. This is a collaborative effort between Forest Service Research, State and Private Forestry, and National Forest System in partnership with other agencies and groups, including the Environmental Protection Agency (EPA), and the National Association of State Foresters. Funding in FY 1993 enabled continuation of detection monitoring in 14 States and initial progress toward establishing intensive site ecosystem monitoring in one forest type.

### **Forest protection research...**

Forest protection research programs are fundamental to the development of improved methods for protecting forest and grassland ecosystems from the adverse effects of insects and diseases. The scale of the research ranges from single species all the way to ecosystem questions of forest health. For example, research at the species level often focuses on single diseases, such as the canker-causing fungus currently threatening butternut trees in the Northeast and Midwest. Forest Service scientists in FY 1993 might have been successful in propagating disease-resistant butternut trees through application of biotechnological methods altering genetic material. At the ecosystem scale are research efforts like the Eastside Forest Ecosystem Health Assessment in eastern Oregon and Washington. Changes in vegetation composition and landscape patterns were monitored over a 50-year period to evaluate the interaction of human impacts with insects, disease, and fire hazards. This health assessment forms the basis for development of an ecosystem approach to forest planning and management in the area.

### **Recreational and commercial harvest of special forest products...**

National forests support opportunities for recreational gathering and commercial harvest of a variety of special forest products (e.g., Christmas trees, pinyon nuts, jojoba beans). The commercial harvest of forest fungi has become a multimillion-dollar industry. The increased commercial harvest of these products has raised concerns centered around destruction of forest habitat, sustainability of the resource, conflict between recreational and commercial harvesters, and regulation and monitoring of future harvests. The Pacific Northwest Forest Experiment Station has sponsored and participated in several regional workshops to inform resource managers and the public of the unique ecology and management opportunities of forest mushrooms. This technology transfer culminated in a recent publication titled "Biology, Ecology, and Social Aspects of Wild Edible Mushrooms in the Forests of the Pacific Northwest—A Preface to Managing Commercial Harvest."

### **Recycling research...**

Recycling research is developing and refining techniques for recycling wood and paper waste products to reduce the burden on landfill resources and conserve energy and timber resources. For example, Forest Service researchers have developed a cheaper and more effective method of removing ink from waste paper products. Enzymes have been substituted for expensive chemicals in the de-inking process. At the Rocky Mountain Station, researchers have replenished organic matter in rangeland ecosystems with city sewage sludge. Application of sewage increases plant growth and water retention while reducing the volume of sewage sludge disposal.

### **Forest Ecosystem Management Assessment Team (FEMAT) report...for the Pacific Northwest.**

Forging strong partnerships between research and land managers is an integral part of implementing a scientifically sound ecological approach to multiple-use management. For example, a collaborative effort involving scientists and technical experts contributed to the development of the 10 management alternatives outlined in the Forest Ecosystem Management Assessment Team (FEMAT) report, which provided vital input to the President's deliberations in development of his strategy for forest management in the Pacific Northwest. The team was assembled as part of President Clinton's effort to resolve the impasse over timber production in spotted owl habitat in the Pacific Northwest. Two significant contributions from the assessment are: (1) the application of ecological knowledge to forest resource management, and (2) the establishment of watershed and riparian areas as fundamental building blocks for landscape scale analysis.

### **More than 2,500 research accomplishments.**

Forest Service Research in FY 1993 had more than 2,500 research accomplishments including books, papers, articles, reports, audio-visual materials and other documents. The



*Chemists at the Forest Products Laboratory have discovered a way to use enzymes to break down cellulose, thus decreasing the costs of paper deinking in the recycling process. Photo by Steve Schmieding, Forest Service*

number of accomplishments reported in the FY 1992 Forest Service Report is consistent with the above definition.

### **Global ecological interactions...**

#### **Responding to Global Resource Issues**

The Forest Service continues to increase scientific exchange and technology transfer to other countries to assist them in their management and use of forest resources and to reduce adverse impacts on global ecosystems. Recognition of the complexity of global ecological interactions has placed greater emphasis on sharing new ideas and scientific knowledge with international partners. Recent national attention on the need for leadership in global sustainable development in areas such as land use, tropical forestry, and environmental education underscores the need for strong coordination in agency international programs.

### **International forestry development projects...**

The Forest Service continues to provide technical expertise and support for international forestry development projects through participation in the Forestry Support Program sponsored by the U.S. Agency for International Development (USAID). In FY 1993, the emphasis of the program in Asia was to improve tropical forest management practices and policies in Indonesia. Further assistance was directed to Indonesia through its selection as a "focus country," a program designed to concentrate on Forest Service international program development in selected countries.

The Forest Service is expanding and strengthening cooperative relationships and partnerships with other countries and organizations sharing the same commitment to global resource conservation. In FY 1993, the Forest Service convened a forum of "community of interests" from 25 Washington, DC, organizations and agencies to share, exchange, and coordinate the international forestry activities of the U.S. Government.

### **The Sister Forests Program was expanded to 11 countries.**

The Forest Service led the U.S. delegation to the United Nations Food and Agriculture Organization Committee on Forestry and encouraged implementation of UNCED initiatives at the Global Forest Conference, "Beyond UNCED," in Indonesia. The U.S. delegation to the United States-Japan Cooperative Program in Natural Resources (UJNR) Forestry Panel met in Tokyo, also led by the agency, and agreed to increase cooperation



in delivering technical forestry assistance to developing countries. A similar agreement was reached with Taiwan. The Sister Forests Program of long-term assistance and exchange of National Forest System personnel with forest units from other countries was expanded to 11 countries in FY 1993.

### **Global change research...**

The U.S. Global Change Research Program is investigating the adverse effects of air pollution, climate change, ultraviolet radiation, and acidic deposition on the productivity and health of global forest ecosystems. The research focuses on disturbance ecology, the flow of atmospheric gas and energy, ecosystem dynamics, and the interaction between human activities and natural resources. Acid rain research and its effect on high mountain wilderness ecosystems is underway in Colorado and Wyoming. Results available in FY 1993 helped land managers monitor and measure conditions of wilderness ecosystems and forecast the effects of air pollution on wilderness. Other global change research focused on the expected rise of carbon dioxide in the atmosphere from global warming. Experiments showed that some plant species, such as loblolly pine, grown under ideal conditions, experience increased growth as carbon dioxide concentration in the atmosphere is increased.

### **Technical assistance, training, and cooperative research...to the developing world.**

Technical assistance, training, and cooperative research to facilitate building the capabilities of the developing world to practice sustainable forest management are provided by the agency. In FY 1993, approximately 207 person years of technical assistance were received by participants. A person year is defined as participation in a given activity for 260 days within a fiscal year. In FY 1993, 552 person years of training were received by participants, and 69 person years of cooperative international research or scientific exchange were achieved.

## ***Addressing The Human Dimension***

The human dimension of the Forest Service mission "Caring for the Land and Serving the People" emphasizes the agency's commitment to attain a multicultural and diverse work force that is responsible and accountable for excellence when serving the American people. Providing work, training, and education to the unemployed, youth, elderly, and disadvantaged is a major priority during program planning and implementation. The Forest Service values a multicultural organization as essential to its success and will continue pursuing changes in the work force composition until it becomes representative of the public we serve.

### **Offered employment and skills training to 135,556 persons.**

#### **Human Resource Programs**

The development of human resources provides valuable training to Americans in need and also leads to accomplishment of high-priority conservation work. During FY 1993, human resource programs offered employment and skills training to 135,556 persons, including many women and minorities. For an investment of \$107.5 million, \$131.4 million in accomplishments were returned from all programs. As a special initiative undertaken in partnership with the National Forest Foundation, the Forest Service established three pilot Youth Forestry Camps in FY 1993. Participants (ages 15-18) from diverse social and economic backgrounds worked on high-priority resource conservation projects while being exposed to ecological concepts and developing important work and social skills.

### **Natural resource conservation projects reached 35,000 Scouts...**

Natural resource conservation education programs are another agency effort to encourage youth training and education with emphasis on increased awareness, knowledge, and appreciation of natural resources. There were numerous accomplishments in FY 1993, such as the Forest Service-sponsored prototype of the President's "AmeriCorps" national service initiative. College and graduate students were recruited to help inner-city youth learn about natural resources and conservation. Other accomplishments include leveraging \$2.5 million with other Federal, State, and local agencies, schools, and private industries to support and fund approximately 200 natural resource conservation projects nationwide,

and reaching 35,000 Scouts and 15,000 adults at the 1993 Boy Scout Jamboree through the Forest Service conservation program, "Caring for Your Forest—Fun and Responsibility."

### **Achieving a Multicultural Organization**

Resource decisions more responsive to the broad spectrum of insights and experiences of society can be achieved through diversifying the educational and ethnic background of the Forest Service work force. The Forest Service has continued to work toward the goals expressed in the March 1991 report, "Toward a Multicultural Organization," by focusing FY 1993 implementation in six areas: training and development; work environment; outreach and recruitment; standards for accountability; work and family; and recognition. Efforts to enhance workplace accessibility for people with disabilities were promoted through new policies in FY 1993, requiring fully accessible meeting and training sites and installation of telecommunication devices for the deaf at all administrative sites.

### **Work force composition...**

The work force composition by race/national origin by the end of FY 1993 was 84.5 percent white, 4.2 percent African American, 4.6 percent Native American/Alaskan Native, 1.4 percent Asian/Pacific Islanders, and 5.2 percent Hispanic. By gender, 39.6 percent (32.8 percent non-minority and 6.8 percent minority) was female and 60.4 percent (51.7 percent non-minority and 8.7 percent minority) was male. These proportions are very similar to those achieved in FY 1992.

### **Partnerships with educational institutions to encourage minority study in natural resources...**

Long-term goals to achieve multicultural diversity are realized through investment in the natural resource education of young people with backgrounds differing in race, color, sex, religion, and national origin. Ongoing partnerships with educational institutions encourage minority study in natural resources through the development of university curriculums in forestry and natural resource related fields. For example, through the Historically Black Colleges and Universities (HBCU) Program, the Forest Service developed a "Center of Excellence" proposal with Alabama A&M University. The Forest Service employed more than 200 summer interns through the USDA Summer Intern Program that included the 1890 Land Grant and other HBCU. The Forest Service also supported 37 projects, valued at \$1.8 million, through the HBCU Comprehensive Program. In a new partnership with the Hispanic Association of Colleges and Universities (HACU), the Forest Service hired 32 summer interns from HACU institutions across the country.

## ***Evolving Administrative Initiatives***

Other important Forest Service initiatives contribute to improvements in all Forest Service program areas.

### **Information Management**

The Forest Service has recently adopted a new information management framework (IMF) designed to move the agency toward an integrated information environment. Implementation of the strategy progressed in FY 1993, with the appointment of a chief information officer to oversee the effort.

### **Project 615 to support GIS and image processing.**

Project 615 is an ongoing effort to upgrade the capability of the Forest Service computing environment to support geographic information system (GIS) technology and image processing. GIS increases resource managers' capability to analyze complex biological, physical, and social data. A 1-year pilot plan for Project 615 was approved in FY 1993.

### **Government effectiveness and efficiency...**

### **Administrative Efficiencies**

In FY 1993, Vice President Gore's National Performance Review Team report identified the Forest Service as one of two agencies successfully implementing pilot programs to increase Government effectiveness and efficiency. The designation as a National Reinvention Lab, as well as Secretary Espy's Team USDA program, offers the Forest Service considerable authority and flexibility to move forward and improve the way the agency

**Restructuring of the law enforcement program to strengthen the independence of investigation.**

**... 400 cooperative law enforcement agreements to provide a safer environment for forest visitors.**

performs public service. For example, the percentage of total payments incurring interest penalties was reduced from 2.1 percent in FY 1992 to 1.7 percent in FY 1993. The Prompt Payment Act of 1982, as amended, requires agencies to pay interest penalties to vendors whenever payments are not made within the agreed to time periods.

**Law Enforcement**

Public trust in the agency to fulfill its stewardship responsibilities is an important element to reinforce as reinvention progresses. The internal investigations and handling of whistleblower complaints have substantially increased the law enforcement workload in recent years. During FY 1993, because of the seriousness of misconduct allegations and increasing law enforcement responsibilities, the agency established a new staff for law enforcement and investigations. The restructuring of the law enforcement program in FY 1993 was designed to strengthen the independence of investigations and to do away with any perceived or real interference.

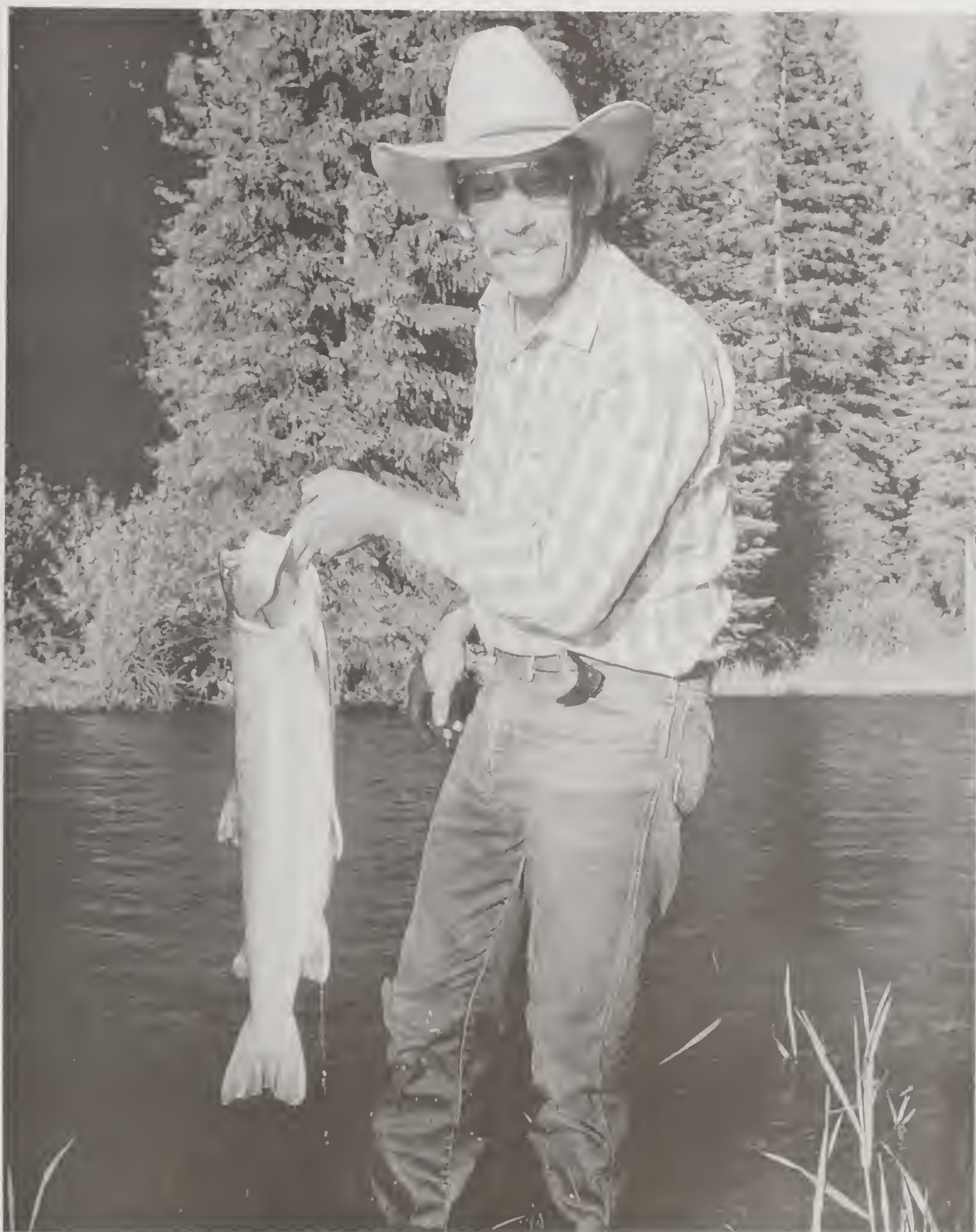
In FY 1993, the Cooperative Law Enforcement Program provided funding for approximately 400 agreements that allowed the Forest Service to cooperate with State and local law enforcement agencies and with other Federal agencies to provide forest visitors a higher level of protection and service.

Drug enforcement efforts in calendar year 1993 resulted in the seizure of over \$3.8 million worth of assets and the destruction of several billion dollars' worth of drugs. The agency continues to place special emphasis on drug control on National Forest System lands.

**Summary**

The Forest Service is a dynamic institution, constantly evolving in response to changing public values and needs, changing statutory and legislative requirements, and changing scientific knowledge influencing the way the agency approaches sustainable multiple-use management of national forests and grasslands. Highlights of accomplishments in FY 1993 begin with the update and clarification of institutional goals through development of the Mission, Vision, and Guiding Principles. This national view of what the organization should become, coupled with the resource vision articulated in the 1990 RPA Strategic Plan and other agency long-term plans offer a solid framework to guide the agency into the next century. Progress toward achieving these organizational goals was enhanced in FY 1993 through efforts to implement the principles of ecosystem management, and through continued efforts to diversify the educational and ethnic background of the work force.







# Resource Program Performance and Accomplishments



## **Management of the National Forests**

### **Ecological Approach to Multiple-Use Management**

During FY 1993, the Forest Service actively pursued an ecological approach to the implementation of multiple-use management activities as the most important management policy for natural resource management of the national forests and grasslands. Results of implementation are evident in research seminars, forest and grassland field projects, regional conferences, and nationwide symposia. Field projects are focusing on a wide range of demonstrations and applications including forest health maintenance, management of riparian ecosystems, economic support to communities, restoration of natural processes, and integrated data collection using state-of-the-art technology. Tables 1 through 4 display a summary of National Forest System accomplishments compared to funding and long-term program trends. Focus areas of implementation are to examine ecological trends and how ecosystems are affected by natural disturbances and human interactions with ecosystems. Four guiding principle areas include: (1) ecological approach, (2) partnerships, (3) participation, and (4) scientific knowledge. These areas define the nature of the work activity for this reporting period.

The Forest Service is, in partnership with numerous agencies and societies, conducting a national ecoregion-based ecological assessment. The assessment is focusing on the role of natural pattern and processes in determining ecological condition and the changes in condition over time. The USDA, Department of the Interior (USDI), Department of Defense (DoD), EPA, National Association of State Foresters (NASF), Wilderness Society, Nature Conservancy, and others are involved.

### **Partnerships**

The Forest Service is taking a leadership role on the USDA ad-hoc ecosystem management team and the interagency ecosystem management working group to enhance cooperation, coordination, and collaboration among agencies involved in ecosystem or sustainable management. Activities include terminology identification, data sharing, implementation and budget development, and coordinated interaction with non-governmental organizations and USDA agencies in policy development.

### **Participation**

Field applications of ecosystem management policy are occurring on virtually every national forest involving grassroots participation by communities, industries, and local people. Because ecosystems cross bound-

aries, the agency is cooperating with other landowners on a voluntary basis, and is working with rural communities to develop local natural resource-based economies that support sustainable ecosystems. At the national level, several key contact meetings were held to collect input for the development of an "ecosystem management national framework." Participants included the Nature Conservancy, Wilderness Society, American Forests and Paper Association, NASF, Congressional Research Service, Ecological Society of America, National Woodland Owners Association, and Sport Fisheries Institute.

### **Scientific Knowledge**

The scientific basis for an ecological approach to multiple-use management is being provided by Forest Service research and cooperative scientists. In FY 1993, studies were conducted to better understand the biological and physical aspects of natural resources, as well as the social/human dimension factors.

The following activities were initiated:

- An ecosystem management framework publication was developed, which included some definitions and principles, a summary of common questions and answers about ecosystem management, case studies, and reports of ecosystem management projects from the field.
- A task team to design a common ecosystem classification and a mapping and inventory system was chartered to address three primary issues: integrated information structures, strategic planning, and uniform processes. The team is coordinating the development of a framework for a national hierarchy of ecological units.

The following task teams were chartered:

- A human dimension team to explore human interaction with ecosystems.
- A communications task team to implement communications strategies in support of ecosystem research and management.
- The ecosystem management education working group to plan for national, integrated, and comprehensive ecosystem management training and continuing education.
- A science task team to coordinate development of strategies to effectively utilize science in the implementation of ecosystem management. The task team has developed evaluation criteria and



screened proposals for joint National Forest System/Research projects on ecosystem management.

- A forest health task team developed the national forest health strategic plan "Healthy Forests for America's Future."
- Numerous information-sharing activities took place, including symposia, workshops, and conferences. These were designed to highlight the best examples of ecosystem management activities, identify the need for research protocols, and provide a forum for strategic ecosystem management policy discussion and a means for technology transfer.

## Land Management Planning

The NFMA of 1976 requires that the agency develop forest plans that guide the multiple-use management of national forests and grasslands. To date, 119 of the 123 forest plans have been completed. Each plan establishes the goals and objectives for the forest during the following 10 to 15 years and the stipulations as to how they will be implemented. The multiple-use management decisions integrate social, economic, and environmental factors. Forest plans are dynamic and are adjusted in a timely manner in response to changing conditions or additional scientific information.

Multiple-use management is the approach required by the laws and policies of the Nation. This approach defines the basic way the Forest Service carries out its responsibilities for meeting the wide range of values, demands, and uses that the American people place upon the 191-million-acre National Forest System. Because demands and uses vary from locale to locale, forest to forest, and region to region, the implementation of multiple-use management is very complex. The complexity is compounded by variations among ecosystems, and the need to accommodate different mixes of uses within the bounds of the same type of ecosystem. This complexity increases over time as the total values, demands, and uses people place on national forests increase.

### Revision of 1982 Forest Planning Regulation

The Forest Service has been engaged in the process of revising the agency's land and resource management planning regulation since early 1990, and worked in a parallel rulemaking effort with the BLM during FY 1993. The purpose of the parallel rule making effort was to develop compatible planning procedures to the maximum extent possible.

The NFMA regulation governs the planning process itself and establishes the national standards for forest

plans. The revised planning regulation will integrate the principles and actions necessary to implement ecosystem management through forest plans. Ecosystem management is catalyzing the need for substantially new ways of designing forest plans and linking them to other planning efforts. The proposed Forest Service regulation would be driven by ecosystem management concepts to the extent currently feasible, given existing statutes and the evolving nature of ecosystem management.

Publication of the proposed rule in the Federal Register was delayed during FY 1993 because of a regulatory review initiative resulting in a moratorium on Federal regulations. However, release of the draft regulation is anticipated in FY 1994.

### Status of Forest Plans

At the close of FY 1993, the last 4 of 123 forest plans were completed in draft for public review and comment. The four California National Forests—Klamath, Shasta-Trinity, Mendocino, and Six Rivers—revised their previously issued draft forest plans due to the listing of the spotted owl as a threatened species.

In FY 1993, the George Washington National Forest issued a final revised forest plan and the Black Hills issued a proposed revised plan. In addition, 19 other forest plans are being adjusted through revision or significant amendment. See table 5 for the status of forest planning, including revisions and significant amendments.

### Implementation and Monitoring of Forest Plans

The NFMA and planning regulations require monitoring and evaluation of completed forest plans. Both monitoring and evaluation are critical to the agency's goal of ensuring that forest plans are dynamic and responsive to changing conditions.

In FY 1993, "National Monitoring and Evaluation Strategy" was published. This strategy provides recommendations and guidance for strengthening monitoring and evaluation efforts. Using the framework provided in the national strategy, each national forest can design and implement its own monitoring and evaluation strategies tailored to assure that all plans are functioning as originally envisioned or needed changes are implemented.

### Status of Forest Plan Administrative Appeals

Administrative appeals of forest plans and amendments, as well as forest plan litigation, continued in FY 1993. Appeals were complex. They were filed by individuals and groups with legal representation. Dur-

ing FY 1993, 101 forest plan appeals were resolved. At the end of FY 1993, 214 appeals were pending on 44 forest plans.

## National Forest System Lands

The lands program activities adjust National Forest System landownership patterns to protect and enhance the resources, protect public and private interests, facilitate management and to provide access for public use. The Forest Service is responsible for the 191-million-acre National Forest System (table 6).

### Landline Location

Identification of property boundaries is fundamental to protecting and managing the national forests. The landline location program provides for surveying, marking, posting, and maintaining the approximately 253,114 miles of National Forest System boundaries. Besides discovering and resolving trespasses mainly due to urban interface, there is also a need to establish boundaries on the growing numbers of specially designated management areas such as wilderness to ensure that their values are protected from encroachment. While work continues toward the establishment of all boundaries, it is necessary to periodically perform maintenance work on established boundaries to prevent their loss through deterioration. The Forest Service and BLM cooperate on surveys of National Forest System land where those surveys become important components of the Public Land Survey System. The BLM is reimbursed for the costs of these surveys.

In 1993, the Forest Service planned to survey and mark 3,298 miles of boundary lines. During the year, the Forest Service exceeded this goal by surveying and marking 3,328 miles of boundary lines (see table 7 and figures 7 and 8). In addition, 4,333 miles of previously surveyed lines were remarked or maintained. Figure 9 shows what the maintenance backlog was by the end of FY 1993.

From 1988 to 1992, the annual landline location program established in excess of 4,000 miles per year. At the end of FY 1993, 103,798 miles or 41 percent of the boundaries were properly established.

A large percentage of the annual landline accomplishment is through contracting with private land surveyors licensed under State laws. This practice promotes rural economic development by increasing employment opportunities.

### Land Exchanges

Land exchange generally involves the conveyance of scattered, encumbered, or developable National Forest System lands which are better suited for national

Figure 7.  
Total Miles of Boundary vs. Landline  
Miles Surveyed—FY 1993

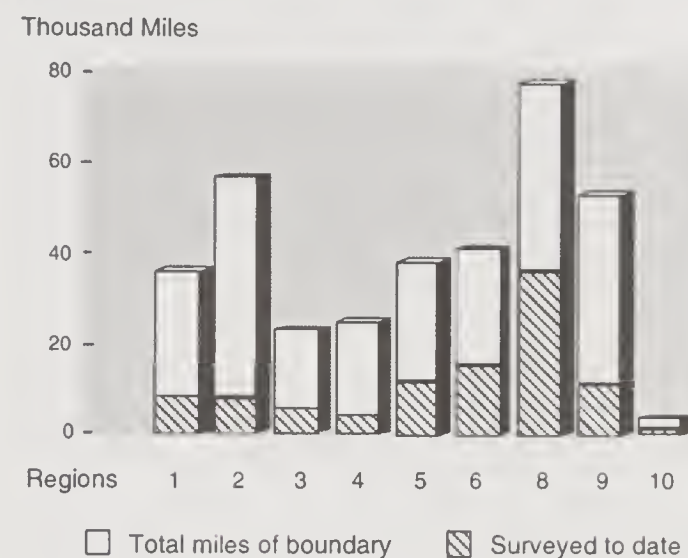


Figure 8.  
Landline Location Accomplishments

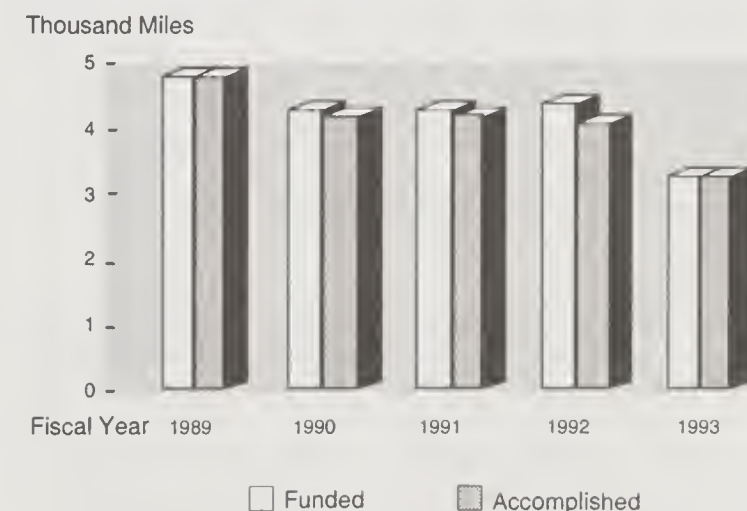
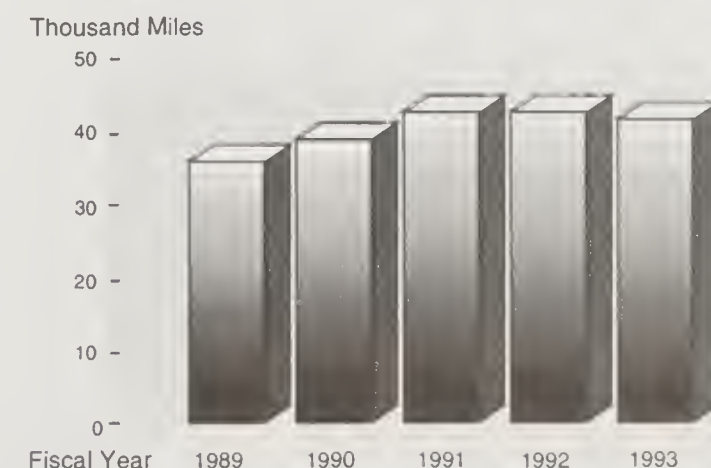


Figure 9.  
Landline Maintenance Backlog



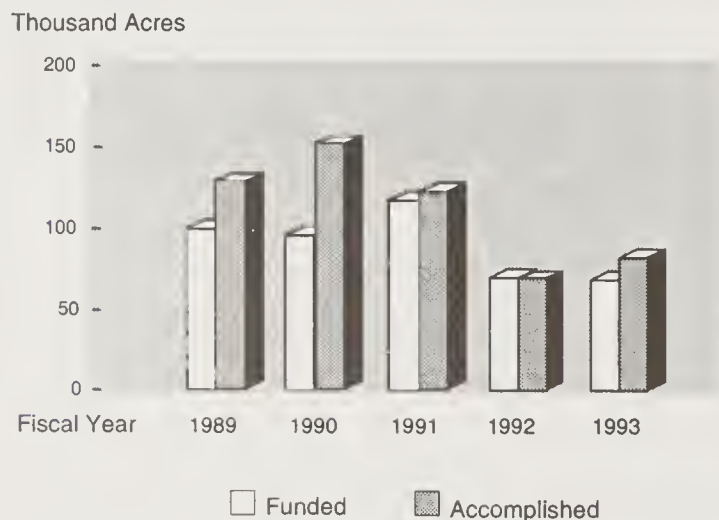


forest purposes in voluntary exchange for an equal fair market value of non-Federal lands needed to protect critical resources from adverse development. These lands are often in congressionally designated areas such as wilderness, national recreation areas, wild and scenic rivers, and national scenic trails. The exchange should contribute to better and more efficient national forest administration and resource management through consolidation of National Forest System landownership or acquisition of critical habitat, wetlands, flood plains, or access.

The objective for FY 1993 was to acquire 67,982 acres of non-Federal land. The Forest Service exceeded this goal by acquiring 81,956 acres of non-Federal land through land exchange (table 8, figure 10). In exchange, 54,680 acres of National Forest System land were conveyed. In addition, work was begun on exchange cases that will be completed and reported in FY 1994 and FY 1995.

From FY 1989 through FY 1992, the land exchange program added 471,481 acres of non-Federal land to the National Forest System in exchange for 316,079 acres of National Forest System land.

Figure 10.  
**Land Exchange Accomplishments**



The Forest Service land exchange program results in the acquisition of many thousands of acres of non-Federal land, much of which lies within classified wilderness areas, national recreation areas, wild and scenic river corridors, national trails, and other congressionally designated areas. The land exchange program also promotes acquiring other critical resource lands that would be adversely developed if not protected.

One of the more tangible benefits of land exchange is the reduction of national forest property boundary lines. In FY 1993, the land exchange program reduced

national forest property boundaries by 820 miles, representing an estimated savings of \$4.5 million in landline location costs.

### Small Tracts Act Conveyances

The Small Tracts Act cases involve the sale or exchange of National Forest System lands to resolve management problems. The cases include unmanageable parcels of National Forest System lands of various sizes and shapes located between patented mining claims, road rights-of-way no longer needed, and small parcels encroached upon by adjoining landowners. Resolution of these cases facilitates management and protection of national forest resources by eliminating parcels of land that are difficult to manage.

The number of cases processed under the Act depends mostly on applications from private parties. Typically, the Forest Service receives about 100 applications a year, with about 60 percent reaching conclusion.

A total of 101 cases were resolved in FY 1993 involving the sale or exchange of 274 acres of National Forest System lands. In return, the United States received 165 acres of land and \$322,406. Since February 1984, following implementation of the Small Tracts Act, 1,500 cases, mostly involving encroachments, have been resolved. This involves the sale or exchange of a total of 2,698 acres of National Forest System land for which the United States has received 1,724 acres and \$2,478,794.

Accurate estimates of the total number of parcels of Small Tracts Act conveyances are difficult. Estimates at the time the Small Tracts Act was enacted included 200,000 mineral survey fractions, over 800 rights-of-ways, and 50,000 encroachments. About 80 percent of the cases resolved have been encroachments, 10 percent mineral survey fractions, and 10 percent road rights-of-way.

The Small Tracts Act program yields significant savings in litigation costs because of the drop in the number of court and legislative cases involving title claims and the reduction in the high cost of trying to manage and protect small fractional parcels of Federal lands.

The annual number (10 to 15) of title claims court cases has been reduced by an estimated 80 percent. Although some court cases are resolved within 3 years, the average case takes from 5 to 10 years to resolve. Some have taken up to 15 years. Costs to the Government are estimated to be from \$20,000 to \$40,000 per case. Of greater significance is the reduced cost to the private litigants and a means through which they can get relief



for qualifying cases. Relief through the courts or through legislation was costly, time consuming and rarely resulted in the relief originally sought.

### Land Acquisition

The land acquisition program provides for the purchase of lands which benefit the public and provide protection of natural and cultural resource values. Lands are acquired based on a priority system which considers recreation opportunities, conservation of threatened or endangered species habitat, protection of significant cultural resources, acquisition of wetland and riparian areas, and protection of rare ecological areas which promote biological diversity. The Land and Water Conservation Fund is the primary source of funding for land acquisition. Land and water conservation funds are derived in part from motorboat fuels tax, sale of surplus Federal property, and receipts under the Outer Continental Shelf Lands Act. Small amounts of land are acquired under special laws which authorize appropriations from the receipts of specified national forests for the purchase of lands to minimize erosion and flood damage. Other lands are acquired through donation.

The objective for FY 1993 was to acquire 69,967 acres of land to benefit natural and cultural resources. The Forest Service exceeded this goal by acquiring 115,731 acres of lands identified in the priority process. These acquisitions represent only a small portion of the lands identified as desirable and available for acquisition.

The land acquisition budget has decreased from \$92 million in FY 1991 to \$62 million in FY 1993. The decrease of \$30 million represents a reduction of approximately 40,000 acres.

Many of the acquired lands improve forest management by consolidating boundaries and providing access to existing national forests and grasslands. Some of the acquired lands are located in congressionally designated areas such as wilderness, national recreation areas, wild and scenic rivers, and national scenic trails.

In FY 1993 significant tracts of land have been acquired, including nationally significant areas such as the Glen House Tract in the White Mountains of New Hampshire and Hope Valley in California.

### Rights-of-Way

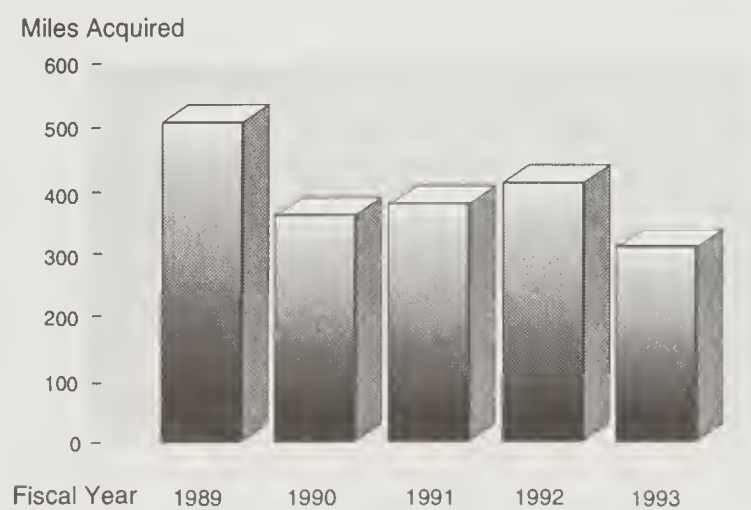
The rights-of-way acquisition program allows access needs to be met by: (1) acquiring right-of-way easements; (2) eliminating the need for rights-of-way by completing landownership adjustments, such as land purchases or exchanges, or (3) assisting in validating the outstanding public status of rights-of-way through cooperative efforts with State and local government

agencies and others. As reported in the 1992 General Accounting Office report "Reasons for and Effects of Inadequate Public Access," 17.3 million acres, approximately 10 percent of all National Forest System lands, lack adequate public access (road or trail).

For FY 1993, an estimated 547 road and 74 trail right-of-way easement cases were identified for acquisition; 77 road and 12 trail right-of-way easement cases were proposed for resolution through landownership adjustment actions; and 20 needed rights-of-way were permanently resolved through cooperative efforts with others.

A total of 729 right-of-way cases were resolved in FY 1993 compared to 657 cases in FY 1992. The National Forest System acquired 387 right-of-way easements involving 282 miles of system road and 27 miles of system trail (figures 11 and 12). In addition, 294 cases involving 144 miles of road and 59 miles of trail right-of-way needs were permanently resolved through Forest Service landownership adjustment activities. Through cooperative efforts with others, the public status of 48 cases involving 81 miles of needed access facilities serving National Forest System lands was also permanently resolved. In total, 317 access corridors providing new administrative and public access routes to National Forest System lands were secured during FY 1993.

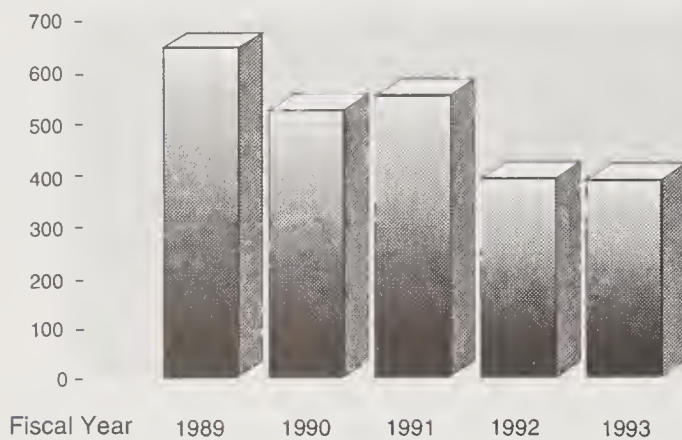
Figure 11.  
Miles of Right-of-Way Acquired—Roads and Trails



In 1988, the Forest Service estimated that 28,000 easements were needed to provide adequate public access to National Forest System lands involving 7,500 miles of right-of-way. Historically, the majority of road rights-of-way acquisition activity has been associated with the timber sale program; however, a large percentage of the needed access is for general management or public recreational purposes. Funding for the access

Figure 12.  
Right-of-Way Acquisitions—Roads and Trails

Easements Acquired



program has been reduced in recent years since road construction funds have declined in Forest Service budgets. The number, cost, and complexity of access cases are increasing due to escalation of closures on historic access facilities, declining numbers of willing sellers, increasing land values, and subdivision. Considering these factors and the current level of accomplishment, it is estimated that it will take 50 years to resolve public access to National Forest System lands.

Over the last decade, there has been a general decline in the number of right-of-way easements acquired since the peak year of 1983 (1,113 cases), compared to the low in FY 1993 (386 cases). In recent years, nearly half of the total accomplishment has been in the areas of eliminating the need for access through land adjustment activities or through "proving up" on the public status of existing facilities by working cooperatively with State and local government agencies.

Overall, the accomplishments in FY 1993 represent an 11-percent increase (657 vs. 729) of the total number of right-of-way cases reported as either acquired or resolved in FY 1992 and a 35-percent increase (234 vs. 317) in new access corridors provided.

No condemnation actions were initiated during FY 1993 to acquire right-of-way easements.

### Special Land Uses

The special uses program administers permitted uses on National Forest System lands so that they benefit the public while natural and cultural resources are adequately protected. The Forest Service administers nearly 200 different types of special uses. These uses facilitate the supply of goods and services to the public and provide support to other Federal, State, and local agencies. Special uses include both commercial and private activities on National Forest System lands. Commercial uses include communications sites, hy-

dropower development, roads and highways, power transmission lines, and various types of pipelines. Private uses include such things as beehives, driveways, signs, and mailboxes. Issuance of a special use authorization incurs an obligation to administer the use to ensure protection of public health and safety and of U.S. interests.

The Forest Land Use Reporting System (FLURS) audits, which review a selected sample of nonrecreation special use permits, show that the number of nonrecreation special uses has not changed significantly over the last several years. Receipts have generally increased each year as new fee schedules and appraisals have brought some rental fees in line with fair market value (FMV).

Special use administration involves processing applications, analyzing environmental impacts, issuing authorizations with conditions to protect national forest resources and ensure public safety, determining and administering fees, inspecting facilities, and monitoring authorized operations.

The administration of 62,063 nonrecreation special uses returned over \$16 million in rental fees during FY 1993. Annual rental fees for special uses are based on FMV, as required by law and administrative direction. Agency efforts to establish FMV have been only partly successful.

For example, rental fees for the 6,000 authorized communication site uses total about \$2 million. The agency estimates FMV for this use would return over \$20 million to the U.S. Treasury. The Forest Service and the BLM continue to cooperate to establish fair market fees for uses on Federal lands, focusing current efforts on communication sites.

Hydropower generation is a specialized area of the special use program. The Forest Service cooperates with the Federal Energy Regulatory Commission (FERC) in reviewing proposals for hydroelectric development and in relicensing existing projects on National Forest System lands. Environmental analysis of the projects can be very complex. The Forest Service inserts conditions to protect National Forest System lands in licenses granted by FERC.

### Wildlife and Fisheries

The agency manages, maintains, and protects healthy ecosystems. The National Forest System provides habitats for more than 3,000 species of birds, mammals, reptiles, fish, and amphibians as well as for more than 2,500 rare plant species. The Forest Service serves as stewards and managers for these national biological treasures, managing habitats to produce



wildlife and fish; protecting threatened, endangered, and sensitive species; and providing recreational opportunities for hunters, anglers, amateur naturalists, photographers, and all national forest users.



*Researchers band, measure and take blood samples from Goshawks to determine any genetic variation within the bird's populations.*

The goal is to maintain the natural heritage and provide benefits to everyone who uses and enjoys the national forests and grasslands. These goals are achieved through the following program areas:

- Wildlife Management
- Inland and Anadromous Fish Management
- Threatened, Endangered, and Sensitive Species Management
- Partnerships
- Wildlife Habitat Relationships Program
- Fisheries Habitat Relationships Program
- Timber, Range, and Minerals Resource Coordination
- Ecosystem Management

In FY 1993, a total of 172,512 acres of habitat improvements were planned on the National Forest

System; 202,868 acres were accomplished. In addition, 16,311 habitat improvement structures were planned; 18,192 structures were completed with appropriated protection and maintenance funds.

#### **"Get Wild!"—The Forest Service Wildlife Program Goals**

The "Get Wild!" program emphasizes the maintenance of healthy ecosystems and habitat improvement for neotropical migratory birds, elk, waterfowl, wild turkey, cavity nesting species, wild sheep, grouse, woodcock, deer, quail, and watchable wildlife. In FY 1993, a primary program focus was migratory birds dependent on tropical ecosystems and National Forest System lands.

Within the framework of "Get Wild!," the Forest Service cooperates with State and other Federal agencies as well as working with wildlife interest groups to manage healthy ecosystems and produce high-quality wildlife habitat. Agency activities include inventorying, surveying, and monitoring of wildlife habitat and populations, and the protection of special habitats such as snags and riparian areas. Interpretive and educational opportunities are provided for forest users.

In FY 1993, the Forest Service planned 96,092 acres of wildlife habitat improvements and 6,152 wildlife structures with protection and maintenance funds. Improvements were made on 117,995 acres, and 6,674 wildlife structures (such as nest boxes and watering devices) were built (table 9) using protection and maintenance funds. Habitat improvements included prescribed burning to rejuvenate growth of food plants, restoration and protection of wetlands, and managing access to minimize habitat disturbance, and provide viewing opportunities.

#### **"Rise to the Future!"—The Forest Service Fisheries and Aquatic Ecology Program Goals**

The Forest Service manages world class fisheries resources that include 2 million acres of lakes and reservoirs, 200,000 miles of rivers and streams, and 16,500 miles of coast and shoreline. These habitats support hundreds of aquatic species important to sport, commercial, and subsistence fisheries. Additionally, national forests provide habitat for more than 104 fish and other aquatic species classified as threatened or endangered under the Endangered Species Act, and more than 235 additional aquatic species that have been designated as "sensitive" by the Forest Service.

"Rise to the Future!" emphasizes using partnerships to improve aquatic habitats and increase opportunities for the public to enjoy fish and other aquatic species on the national forests. Under "Rise to the Future!," the Forest Service inventories, restores, improves, and creates



aquatic habitats; monitors river, stream and lake habitats; and provides interpretive, educational, and recreational opportunities for forest visitors.

In FY 1993, the Forest Service planned 11,077 acres of inland fish habitat improvements and 4,829 fisheries habitat improvement structures using protection and maintenance funds. Appropriated protection and maintenance funds for inland fisheries management were used to improve 16,982 acres of habitat, and build 4,928 habitat improvement structures (table 9). Projects included riparian restoration, introduction of hiding cover, and creation of recreational fishing ponds.

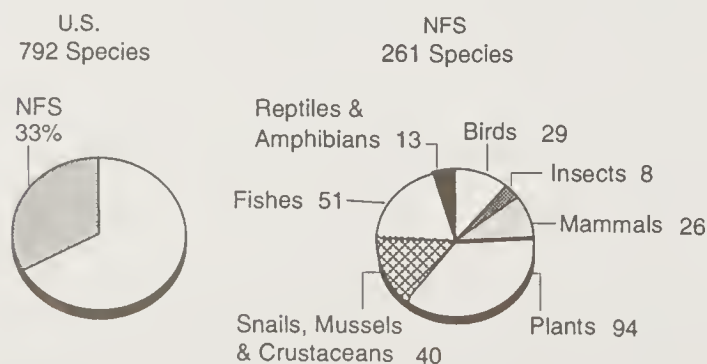
In FY 1993, the Forest Service planned 7,184 acres of anadromous fish habitat improvements and 3,718 anadromous fish habitat improvement structures using protection and maintenance funds. Improvement of anadromous fish habitat was accomplished on 6,012 acres and a total of 4,116 anadromous fish habitat improvement structures were completed. This represents 84 percent of the total habitat improvement structures projected for FY 1995 in the 1990 RPA Program (table 9). Habitat restoration and enhancement projects for anadromous fish included rehabilitation of spawning and rearing habitats degraded by past human activities and removal of barriers restricting fish migration.

### "Every Species Counts!"—The Forest Service Threatened, Endangered, and Sensitive Species Program Goals

The National Forest System is home to more than 260 plant and animal species listed as either threatened or endangered by the U.S. Fish and Wildlife Service (figure 13). This represents 33 percent of all federally listed species. Successful recovery of these species depends on Forest Service collaboration with Federal and State agencies, private organizations, and individuals. In addition, the Forest Service has identified 2,200 sensitive species that are managed to prevent the need for Federal listing.

Figure 13.

#### Species Federally Listed as Endangered or Threatened—FY 1993 1/



1/ These species include all varieties of life from mammals to plants to mussels.

Mitigation and implementation of conservation activities are part of the Threatened, Endangered, and Sensitive (TES) species program operations. The Forest Service has collaborated with the U.S. Fish and Wildlife Service on 35 recovery plans, including plans for the American peregrine falcon, grizzly bear, and northern spotted owl. Through "Every Species Counts!," the Forest Service continues to broaden TES species program to manage, protect, and conserve plant communities and aquatic species. In FY 1993, forests and regions continued to work closely with State natural heritage inventory programs to conduct surveys and develop conservation strategies for sensitive plant species. Botanists' activities included discovery of new rare plant locations, habitat improvement, protection, and restoration, and public education efforts.

In FY 1993, the Forest Service planned 58,149 acres and 1,612 structures for threatened, endangered, and sensitive species with protection and maintenance funds. Using protection and maintenance funds, 61,880 acres were improved and 2,474 structures were built.

### Partnerships Program

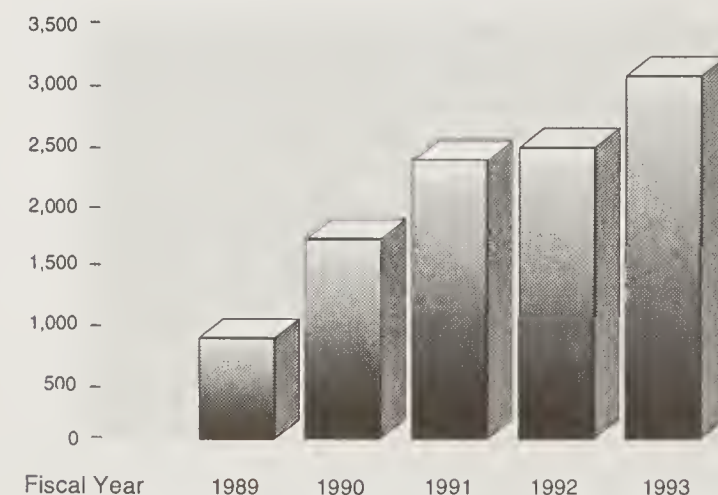
In managing habitats on the National Forest System, the Forest Service formally cooperates with 44 State fish and wildlife agencies that are responsible for managing animal populations and with 49 other Federal agencies and conservation groups.

Five-year growth trends in the number of partnerships show the tremendous interest in the program. Numbers of partners expanded from 197 in FY 1987 to 3,086 in FY 1993 (figure 14). More than \$3 of challenge cost-share money was contributed by partners for every \$2 of appropriated funds. In FY 1993, the Forest Service and its partners turned \$14.3 million of Federal funding into \$34.1 million worth of habitat improvement projects

Figure 14.

#### FY 1993 Wildlife Challenge Cost-Share Cooperators

Number of Cooperators

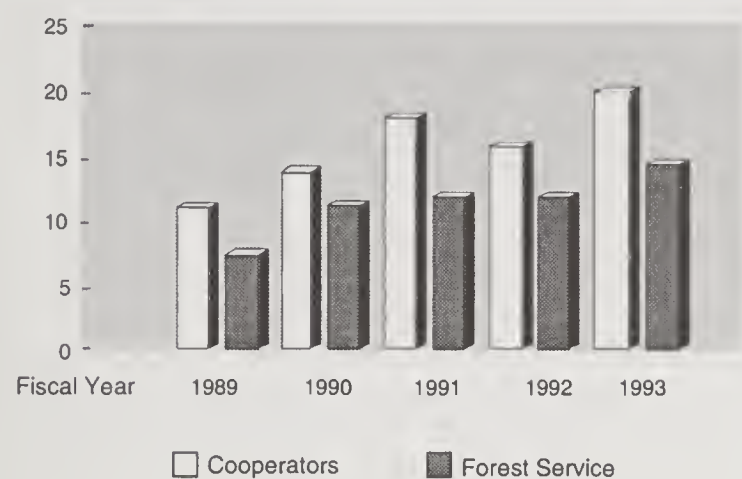


on the National Forest System (figure 15). Thousands of people from hundreds of sporting organizations as well as civic groups, corporations, Scout troops, government agencies on all levels, and many individuals helped make possible the completion of 2,276 habitat improvement projects for wildlife, fish, and threatened, endangered, and sensitive species.

Figure 15.

#### FY 1993 Wildlife Challenge Cost-Share Funding

Million 1993 Dollars



**National Fishing Week:** The events and programs held during this presidentially proclaimed week provide unique opportunities for all families to learn more about aquatic ecology, get involved in sport fishing, and to enjoy and help manage their national forests. In cooperation with thousands of national, State, and local partners, the Forest Service hosted a total of 363 events in FY 1993, reaching more than 50,000 children and nearly 37,000 adults. Over 2,500 Forest Service employees and 3,200 volunteers participated in the events.

**"Bring Back the Natives":** In FY 1993, the Forest Service, the BLM, and the National Fish and Wildlife Foundation cooperatively funded 34 "Bring Back the Natives" projects in 13 States. Four other Federal agencies, 1 tribe, 18 State agencies, 2 local governments, and 41 private organizations also contributed to the success of these watershed scale restoration efforts that focused on conservation of native aquatic communities.

**Celebrating Wildflowers:** In FY 1993, the Forest Service, in cooperation with many other public and private partners, held a variety of educational and public awareness events as well as completed many habitat improvement projects. Several hundred events celebrated wildflowers and focused attention on the importance of native plants and the need to conserve flora. These events included speeches, classroom presenta-

tions, displays, research projects, habitat restoration and protection activities, and removal of pest plants.

**Proposed PACFISH Strategy:** PACFISH is an interagency effort to develop a strategy for management of watersheds on Forest Service and BLM administered land within the range of Pacific anadromous fish. The strategy is responsive to the agency's ecosystem approach to management. Specifically, the PACFISH strategy is concerned with maintaining or restoring healthy, functioning watersheds, riparian areas, and associated fish habitats, as reflected by easily quantifiable habitat features that are good indicators of system health (such as pool frequency, water temperature, woody debris, streambank stability and lower bank angle, and stream width-to-depth ratio). The strategy is being directed toward providing habitat conditions on Forest Service and BLM administered lands that contribute to the recovery and sustained natural production of Pacific salmon, steelhead, and sea-run cutthroat trout. Habitat conservation is but one part of the effort necessary to increase the populations of "at risk" Pacific anadromous fish species. This joint habitat conservation effort will not, by itself, ensure the recovery of Pacific anadromous fish populations. The PACFISH strategy does not address other factors affecting the status of Pacific anadromous fish such as hydropower development, hatchery operations, and ocean harvesting that are beyond the jurisdiction of the Forest Service and BLM.

#### Fisheries Habitat Relationships

Housed at Utah State University in Logan, the Forest Service's Fisheries Habitat Relationships (FHR) Program provides information, methodology, and technology to the agency's field units to ensure that aquatic habitat and fisheries resource needs are adequately addressed in forest plans and management activities.

#### Wildlife Habitat Relationships

The Wildlife Habitat Relationships Program (WHRP), located in Corvallis, Oregon, provides technical assistance to the regions in the areas of science, viability assessments, habitat inventory, wildlife monitoring, species modeling, adaptive management, and continuing education. The program plays a key role in defining wildlife's role in ecosystem management. The National Wildlife Ecologist assisted in the development of the President's Forest Plan for the Pacific Northwest in cooperation with the Fish and Wildlife Service, the National Park Service, the BLM, and State forestry and wildlife agencies.

The Fisheries Habitat Relationships and Wildlife Habitat Relationships Programs continued to play a prominent role in developing continuing education short courses.



In FY 1993, a total of 330 resource management professionals from the Forest Service, BLM, and State agencies completed courses sponsored by the continuing education program.



### Timber, Range, and Minerals Resource Coordination Program Accomplishment

Congress appropriated \$116 million for wildlife, fisheries, and rare plant management on the National Forest System in FY 1993. Of these appropriated funds, \$16.4 million were allocated to timber support for resource coordination on activities by wildlife and fisheries biologists, as well as botanists, involved in the planning and review of timber sales. In FY 1993, biologists also assisted in the development and review of range allotment management plans and minerals cases. In FY 1993, 10,784 biological evaluations/assessments (BE/BA) in support of Forest Service resource management activities were completed. These BE/BA documents assure agency compliance with the Endangered Species Act and the National Environmental Policy Act, as well as providing needed analysis of Forest Service activities.

### Managing Ecosystems and Protecting Biodiversity Goals

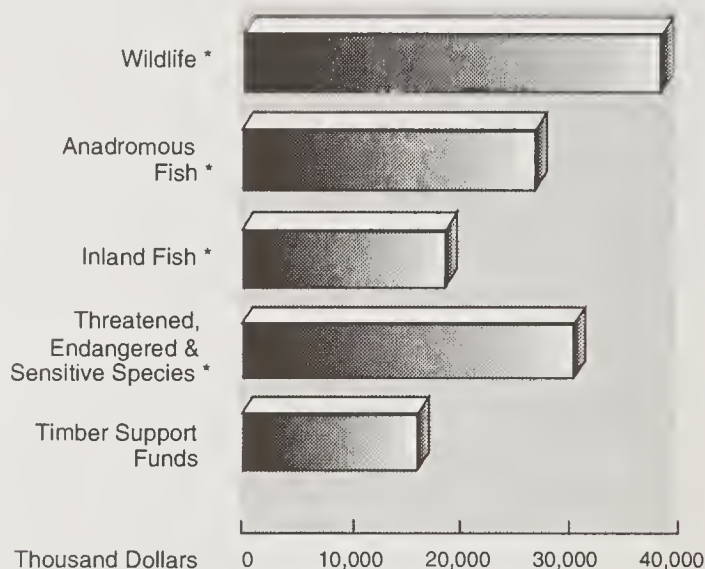
Effective ecosystem management depends on the quality and quantity of knowledge about the plants and animals dependent on these ecosystems, as well as their interaction with the abiotic factors present in the environment. Annual surveys to determine species distribution, habitat quantity and quality, and population levels provide the information needed to continue Forest Service management activities.

Alerted by crises in the Pacific Northwest, California, the Southwest, and the Southeast, the Forest Service has begun grappling with the growing problem of the decline and loss of species on public and private lands. About one-quarter of the Pacific anadromous salmon and trout "stocks" or populations are already considered extinct, and over half of the 400 stocks are at moderate to high risk of extinction. Federal listing of species is predicted to increase in the next five decades.

Actions benefiting threatened, endangered, and sensitive species mark the implementation of ecosystem management. Managing high-profile species like the grizzly bear, northern spotted owl, Pacific salmon, and red-cockaded woodpecker requires integrated planning and habitat improvement to maintain the health of the entire ecosystem. Areas such as the northern Rockies, Pacific Northwest old-growth Douglas-fir forest, and Southeastern longleaf pine-wiregrass forests are analyzed at ecosystem levels. Conservation efforts for the California spotted owl in the Sierra Nevada Range and the northern goshawk in the Southwest also focus on ecosystem management. They improve general forest health while providing sufficient protection for key species to prevent the need for Federal listing.

In FY 1993, 4,781,428 acres were surveyed for rare or imperiled species, 481,688 were surveyed for anadromous fish, 81,692 acres were surveyed for inland fish, and 3,060,165 acres of wildlife surveys were completed with appropriated protection and maintenance funds (table 9). Figure 16 illustrates the different funding categories and amounts available for wildlife, fish, and rare plants protection and management during FY 1993.

Figure 16.  
FY 1993 Wildlife, Fish, and Rare Plants Funding



\* Includes \$7,297,000 devoted to ecosystem management.

In FY 1993, National Forest System lands provided an estimated 51 million activity occasions of recreational fishing, with an economic value of more than \$2.3 billion (figure 17). Nearly 115 million pounds of fish from the National Forest System were commercially harvested in FY 1993, at a value of more than \$189 million. Approximately 113 million pounds of anadromous fish was harvested. This represents 90 percent of the commercial anadromous catch projected for FY



1995 in the 1990 RPA Program. The National Forest System provided 26.3 million activity occasions of sport hunting at an economic value of \$1.1 billion (figure 18).

Figure 17.  
FY 1993 Wildlife and Fisheries Benefits



Figure 18.  
FY 1993 Wildlife and Fish Activity Occasions



- 1/ Fishing activity occasion averages 4.3 hours of participation.  
 2/ Hunting activity occasion averages 7.9 hours of participation.  
 3/ Nonconsumptive activity occasion averages 3.9 hours of participation.

Photography, bird watching, and nature study are becoming increasingly popular. In FY 1993, the National Forest System provided 32.8 million activity occasions of nonconsumptive use. This use is valued at approximately \$956.7 million. These activities, besides providing enjoyment, employ 103,109 people in jobs related to natural resource recreation and tourism goods and services. Additionally, these uses generate about \$2.3 billion in local community income. The number of combined visits to fish, hunt, and view wildlife on the National Forest System is expected to increase by 183 percent in the next 50 years.

Forest Service management activities contributed to the reclassification of two endangered species in FY 1993. The MacFarlane's four o'clock (*Mirabilis macfarlanei*), a perennial with large magenta flowers, was proposed for downlisting to threatened status. The Louisiana pearlshell (*Margaritifera hembeli*), a freshwater mussel, was reclassified to threatened status.

## Recreation, Heritage, and Wilderness Management

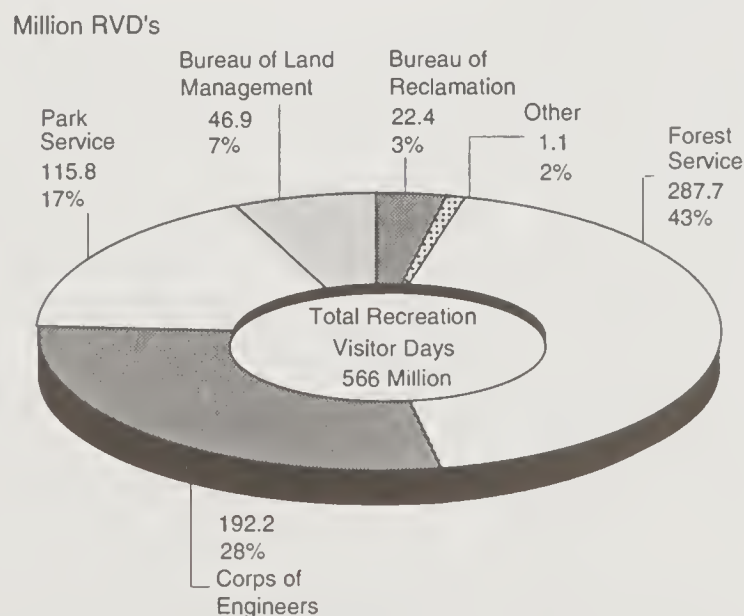
### Recreation

National forests offer a multitude of recreation opportunities from wilderness to urban experiences; from organized activities to individual boating and hunting; from guided auto tours along forest roads and waterways to white water rafting; from backpackers hiking on remote hiking trails to volunteering on archaeological projects.

The nature of recreation has changed in the last decade. The public wants educational opportunities, interpretation of natural and cultural resources, special areas to learn about the environment, and most importantly, involvement in caring for the land. The visitors are changing to include more senior citizens, Americans with disabilities, and people of diverse ethnic backgrounds.

The national forests are the leading Federal provider of total outdoor recreation use (figure 19). The Forest Service provides about 43 percent of Federal recre-

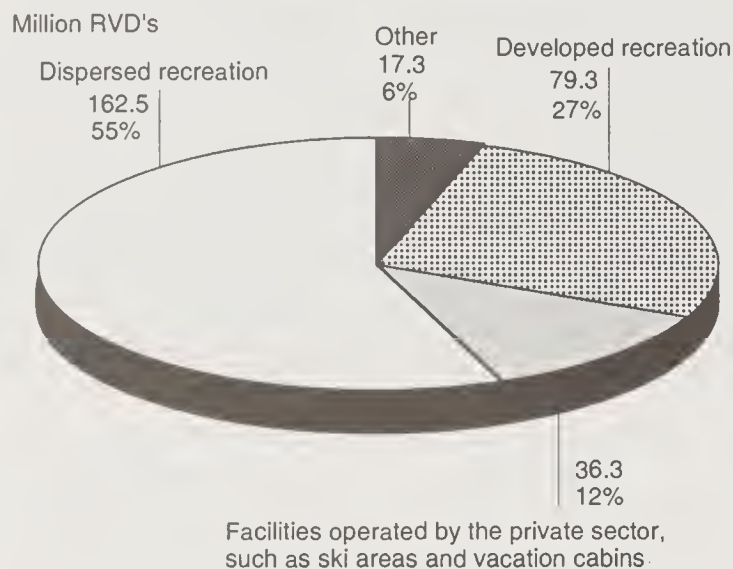
Figure 19.  
FY 1992 Recreation Visitor Days (RVD's) by Federal Agency 1/



1/ In FY 1993 the Forest Service reached 295.5 RVD's; data from other agencies not yet available.

ational use. User trends show a continuing increase since 1985. Figure 20 shows recreation use by activity. Recreation use increased by 3 percent in FY 1993 over FY 1992, (table 10). Table 11 displays the distribution of recreation use by activity for each State.

Figure 20.

**FY 1993 Recreation Visitor Days (RVD's) by Activity**

While the planned output target for FY 1993 was 140 million recreation visitor days, the national forests hosted 725.5 million recreation visitors, equating to 295.5 million RVD's. (A recreation visitor day is 12 hours of visitation by one or more persons.) This represents a 2.7 percent increase over recreation use reported for FY 1992 and is 96 percent of the total RVD's projected for FY 1995 in the 1990 RPA Program. The most significant use increase occurred in mechanized travel and viewing scenery.

**Recreation Receipts**

Receipts from recreation use fees have remained level for the last 3 years. In FY 1993, recreation receipts were \$49.3 million, a 6-percent increase over FY 1992. The fees recovered 28.6 percent of total recreation management appropriations of \$171.8 million (figure 21). Campgrounds and other developed facilities generated \$13.2 million compared with \$14.9 million in FY 1992. The reduction is due to adding more campgrounds under recreation special use permits, which reduces receipts and transfers the fee to the recreation special uses account. Recreation special use fees, principally for ski areas, outfitters and guides, generated \$36.1 million in FY 1993, up from \$31.5 million in FY 1992.

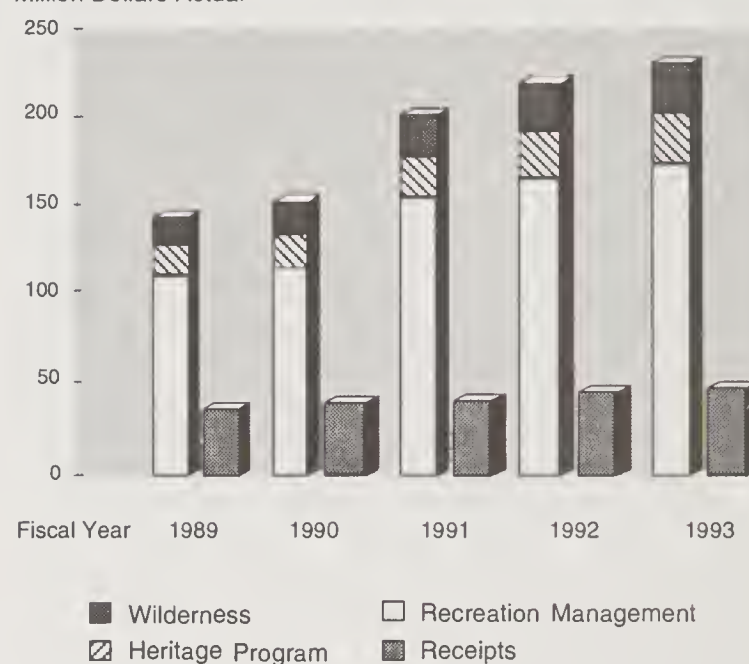
**Challenge Cost-Share and Volunteers**

Quality recreation management continues to be emphasized. In recreation use challenge cost-share projects, the Forest Service and its partners cooperatively accom-

Figure 21.

**Recreation—Funding and Receipts**

Million Dollars Actual



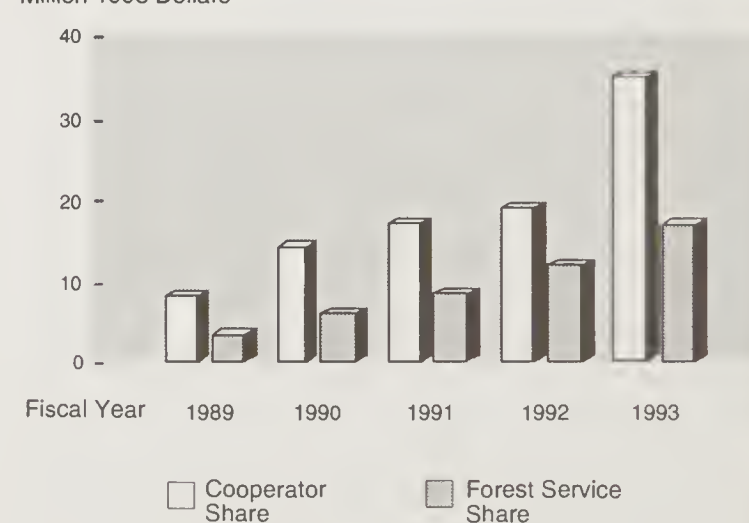
plish work such as natural resources education, improved campground access for Americans with disabilities, development of interpretive sites, investigating archaeological sites, and numerous publications.

Total Forest Service appropriated funding for the challenge cost-share program has increased from \$600,000 in FY 1988 to \$16.6 million in FY 1993 (figure 22). Funds were allocated in recreation management, heritage, wilderness management, and trails management. Field units were directed to emphasize the challenge cost-share program, especially on high-use areas.

Figure 22.

**Recreation Use—Challenge Cost-Share Funding**

Million 1993 Dollars



The challenge cost-share program for recreation use contributed \$50.8 million.

Volunteers and participants in the Touch America project contributed work valued at \$23.3 million on recreation-related projects. This represents 62 percent of the total work contributed. Figure 23 displays the cost share and other volunteer programs' contributions.

**Accessibility**

Utilizing the principles of "universal design," the Forest Service assures that recreation facilities, programs, and services consider the needs of all users—children, older people, and people with sensory, cognitive, and mobility disabilities.

In 1987, the agency established the goal of "being the leading provider of accessible outdoor recreation." Since then, the Forest Service has conducted more than 100 training sessions in access survey and awareness, sponsored workshops on "Incorporating Universal Design," conducted accessibility surveys, established partnerships with more than 90 community organizations for access, and completed more than 600 accessibility projects on national forests throughout the country. Additionally, the agency has established national public/private partnerships with four national organizations, representing outfitters, guides, product manufacturers, and designers.

A partnership with Project Play and Learning in Adaptable Environments, Inc., was established to edit, illustrate, publish, and distribute the "Universal Access to Outdoor Recreation: A Design Guide."

The "Universal Design and the Outdoor Environment" was the first nationally accredited, 2-week short course held in October 1993. Among the 30-plus participants

were regional and forest landscape architects, architects and engineers, and an attendee from the BLM. A 3-year commitment was made to fund a national universal design short course. In FY 1993, the draft was finalized, including the laws, legislation, and movements leading up to universal design. A new chapter for the design guide was developed to assist designers and planners in applying the technical specifications to actual sites. The design guide was edited and illustrated in FY 1993.

The Forest Service established a partnership with Wilderness Inquiry and America Outdoors to develop a manual for outfitters and guides that will assist them in incorporating universal design into their programs and services.

**Tourism**

The Forest Service is actively involved in developing tourism partnerships with local, regional, and State organizations in order to assist rural communities in diversifying and strengthening their economic base. Total visitation is forecasted to continue to increase in part due to heightened interest in nature tourism. In FY 1993, the emphasis was on development of stronger cooperative programs with State tourism agencies.

The Forest Service has become an established participant in the tourism programs of most States with National Forest System lands. Implementation of memorandums of understanding between seven Federal land managing agencies and the Travel and Tourism Administration began in FY 1993. Implementation efforts have identified information needs for international markets, development of a directory of key contacts within each agency, and a directory of key agency tourism publications.

Figure 23.

**VALUE OF WORK CONTRIBUTED  
FY 1993**

	Amount of FS Funding	Amount of Partner Contribution
	<i>1,000 dollars</i>	
Challenge Cost-Share - Recreation Management	4,800	12,068
Challenge Cost-Share - Cultural Resources	1,409	2,818
Challenge Cost-Share - Wilderness	803	1,606
Challenge Cost-Share - Trail Maintenance	1,469	2,938
Challenge Cost-Share - Recreation/Trail Construction	6,625	13,250
Volunteer & Touch America Project	NA 1/	23,261
	Total	55,941

1/ Not available; not applicable.



## Scenic Byways

Driving for pleasure and viewing scenery account for more than 34 percent of total recreation use on national forests. The National Forest Scenic Byways Program identifies routes that traverse scenic corridors with outstanding aesthetic, cultural, or historical values. These byways offer motorists a spectrum of unique forest settings, ranging from dense rain forests to northern hardwoods to mountain tundra and alpine forests.

The Forest Service designated its first national forest scenic byway in 1988. The program has grown to 120 national scenic byways within National Forest System lands in FY 1993, covering nearly 6,922 miles in 34 States. Eleven scenic byways were nominated in FY 1993; 9 of the 11 were added to the National Forest Scenic Byways Program.

In FY 1993, the Forest Service participated in the Scenic Byways National Conference sponsored by the American Recreation Coalition.

## Recreation Facility Management

The Forest Service manages about 20 percent of the national forest campground capacity under special use permit. Over 18,000 facilities, including campgrounds, trailheads, boat ramps, picnic areas, and visitor information centers as well as privately owned facilities on National Forest System lands such as recreation residences and ski resorts can accommodate 1.8 million people at one time (PAOT). (PAOT's are calculated by multiplying a site's design capacity by the number of days per year that the site is open for public use.) Of the design capacity of 159 million PAOT's, in FY 1993 the Forest Service operated and maintained facilities with a capacity of 144.1 million PAOT days.

Visitor use of developed recreation sites was 74.1 million RVD's in FY 1990, 76.6 million RVD's in FY 1991, and 77.2 million RVD's in FY 1992. In FY 1993, visitor use of developed recreation sites represented 79.3 million recreation visitor days. While use continues to increase, the condition of national forest recreation facilities continues to decline due to a shortfall in resources to operate and maintain them. Approximately 27 percent of national forest recreation facilities are 40 years old, and 50 percent are more than 20 years old. Normal life for most facilities is about 20 years. At the end of FY 1993, the Forest Service had a deferred maintenance and repair funding need of over \$750 million.

## Wild and Scenic Rivers

In 1968, when the Wild and Scenic Rivers Act was passed, there were eight rivers included in the system, five of which were administered by the Forest Service. The National Wild and Scenic Rivers System totals

10,410 miles, of which 4,316 miles are managed by the Forest Service. Of the 153 rivers or river segments in the system nationwide, 96 rivers are managed by the Forest Service. No new rivers were added in FY 1993. Recommendations for designation of an additional 127 National Forest System rivers resulted from forest planning and special river studies. An additional 605 rivers have been identified as having outstanding resource values and free flowing characteristics, making them eligible for the Wild and Scenic Rivers Program.

Further studies are presently in progress on about 200 of these rivers. River management plans were initiated for the 26 rivers designated by Congress in FY 1992.

## Special Recreation Areas

Special recreation areas are congressionally designated and must be managed with an emphasis on recreation, scenic, or unique attributes. The National Forest System contains 47 legislatively established special recreation areas totaling more than 8.7 million acres in 19 national recreation areas, 6 national scenic areas, 4 national monuments, and 20 other areas.

From FY 1986 to FY 1993, funding for special recreation areas nearly tripled. Congress has increased the number of special recreation areas by 17 percent during the last 3 years. The Spring Mountain Area was added in FY 1993.

## Trails

Trails are used by cross-country skiers, hikers, horseback riders, all-terrain vehicle riders, motorcyclists, snowmobilers, and bicyclists. The total trail system contains 121,059 miles (table 12).

Efforts to reduce a Forest Service trails backlog of \$299 million identified in FY 1991 have continued. Current backlog of trail construction, reconstruction, and maintenance is \$271,818,641. Most trail maintenance work involves the reconstruction of existing trails. The long-range goal is to eliminate the backlog of trail work and redevelop the trail system to meet the needs of contemporary and future users.

In FY 1993, the Forest Service planned to complete 77,000 miles of trail maintenance work; a total of 71,152 miles of maintenance work was actually accomplished. Trail maintenance includes clearing the pathway of encroaching vegetation and fallen trees, and repairing or improving trail signs, treadways, drainage facilities, and bridges. To improve this system of 121,059 miles, the Forest Service constructed or reconstructed 1,976 miles with appropriated funds and accomplished 203 additional miles through contributions from partnerships and volunteers.

In FY 1993, 30 million recreation visitor days were spent using trails. This accounts for 10 percent of all use on National Forest System lands.

### Wilderness

The Forest Service manages 397 units of the National Wilderness Preservation System in 36 States. This includes 34.6 million acres, or approximately 18 percent, of the National Forest System. Forest Service managed wilderness is 75 percent of the National Wilderness Preservation System in the lower 48 States, and 36 percent of the entire system including the Alaska wilderness.

Designated wilderness has increased from 9 million acres in FY 1964 to 95 million acres (34.6 million in the National Forest System) in FY 1993 (table 13). On August 13, 1993, the Colorado Wilderness Act of 1993 was signed, designating nine new areas totaling 553,203 acres of National Forest System lands as wilderness. The Forest Service was actively involved in congressional consideration of additional wilderness in Montana and Idaho.

Management emphasis has shifted from management of people and people impacts to management of all the values in wilderness (historic, scientific, scenic, cultural, etc.). Training for wilderness managers has increased, with over 500 supervisors, staff and wilderness field managers receiving a week of formal training in wilderness management. The Forest Service took the lead in the establishment of the interagency Arthur Carhart National Wilderness Training Center and the Aldo Leopold National Wilderness Research Institute in Missoula, Montana. These two centers are devoted to expanded training and research in wilderness research and management.

Recreation in wilderness areas accounted for 12.7 million recreation visitor days in FY 1993. Wilderness funding has doubled in the last 6 years from \$12.5 million in FY 1988 to \$27.7 million in FY 1993.

### Heritage

The Heritage Program strives to preserve the historical and cultural foundations of the Nation as a living part of community life and development. Inventory and evaluation of significant sites contribute to preservation, ecosystem analysis, and public interpretation.

In the past, the Heritage Program has focused on inventory and site evaluation in response to proposed undertakings. This aspect of the program has leveled out at approximately 1.9 million acres inventoried per year. The Heritage Strategy, signed in FY 1993, strives to balance the responsibilities in the Heritage Program



including inventory and evaluation, interpretation, curation, and protection.

A focus on public outreach, partnerships, and environmental education during FY 1993 made the program more responsive to the public's interest in archaeology and history. The restructuring of the project support activities made them more responsive to the ecological approach to multiple-use management.

"Windows on the Past," an interpretive initiative, has greatly increased public participation in heritage activities on national forests. Through "Passport In Time" (PIT), 1,300 volunteers working with the Forest Service professionals were able to focus on broader surveys including some wilderness area surveys, monitoring of sensitive sites, restoration of significant historic structures, and interdisciplinary, paleoenvironmental studies. In FY 1993, more than 2 million visitors attended heritage celebrations.

PIT projects have increased from 10 in FY 1990 to 92 in FY 1993. In response to public demand, a second season has been added that includes from 15 to 20 winter projects.



A highlight was the Conference on Environment and Archaeology held in San Juan, Puerto Rico. The conference focused on heritage management as an important economic resource for developing countries.

During FY 1993, 1,300 volunteers contributed approximately 51,000 hours to 92 PIT projects, including archaeological excavation, historic reconstruction, oral history collection, survey, monitoring, and restoration. PIT projects took place on 66 national forests in 8 regions and in 27 States.

## Law Enforcement

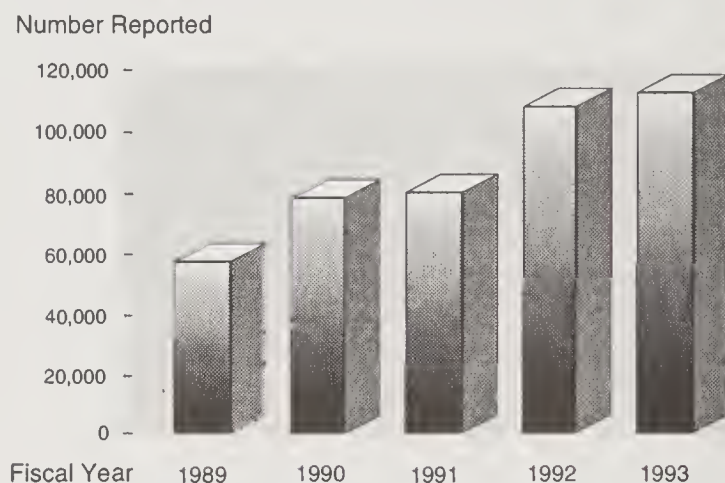
The Forest Service law enforcement objective is to protect National Forest System visitors and their property, agency employees, natural resources, and Federal property. The ultimate goal is to eliminate all illegal activities from the national forests and grasslands or any other Forest Service facility. The program focuses on activities such as vandalism, cultural resource violations, timber theft, wildland arson, and the cultivation and production of illegal drugs. During FY 1993, approximately 175 special agents and 600 other law enforcement officers performed investigation and enforcement activities that are unique to the National Forest System and its resources.

During FY 1993, the agency sent 43 employees to basic law enforcement training and offered advanced law enforcement training programs to 128 employees. Ninety-one employees attended the Law Enforcement for Managers (LEM) class in FY 1993. Forest Service law enforcement instructors trained over 359 State and local law enforcement personnel in such areas as wildfire investigation and technical investigative equipment programs.

During FY 1993, 116,985 incidents or violations of Federal laws and regulations were reported on the National Forest System. These violations resulted in millions of dollars in damages and losses to National Forest System property and resources. Violations included timber theft, arson, theft of archaeological artifacts, vehicle use prohibitions, occupancy and use violations, and health and safety hazards. The number of violations reported has increased in recent years, as displayed in figure 24.

In FY 1993, the Cooperative Law Enforcement Program provided funding for approximately 400 agreements allowing the Forest Service to cooperate with State and local law enforcement agencies and other Federal agencies to provide forest visitors a higher level of protection and service. Cooperative law enforcement funding was also used to maintain about 250 drug control agreements with State and local law enforce-

Figure 24.  
Law Enforcement Incidents and Violations



ment agencies, other Federal agencies or task forces to collaborate in eliminating illegal drug activities on the National Forest System.

During calendar year 1993, nearly 523,178 cannabis plants were eradicated from 10,043 sites on the National Forest System. Arrested were 1,395 individuals for illicit controlled-substance production and distribution on the national forests. Drug enforcement efforts in calendar year 1993 resulted in the seizure of over \$3.8 million worth of assets and the destruction of several billion dollars' worth of drugs. The agency continues to place special emphasis of drug control on the U.S./Mexico Border and some areas in the Southern States.

Criminal investigation in the national forests has become increasingly complex, particularly in the area of timber theft. For example, the North Santiam timber theft investigation in western Oregon involved over 200 Forest Service employees under direction of the newly formed Timber Theft Task Force. In FY 1993, it resulted in felony convictions of a scaling bureau, timber purchaser, and log scaler. Another timber purchaser paid \$1.7 million in penalties. Fines and penalties collected in this investigation totaled \$3.3 million.

The internal investigations of whistleblower complaints have substantially increased the law enforcement workload in recent years. During FY 1993, because of the seriousness of misconduct allegations and increasing law enforcement responsibilities, the agency established a new staff for law enforcement and investigations.

## Fire and Aviation Management

Fire and aviation management activities on the National Forest System lands are under the leadership of the State and Private Forestry Deputy Area of the Forest



Service, and are directly coordinated with cooperative fire protection activities.

### Fire in Support of an Ecological Approach to Forest Management

Fire is a fundamental ecological process important in maintaining healthy forest systems. A discussion paper was developed and disseminated (internally and externally) describing fire's role in ecosystem management.

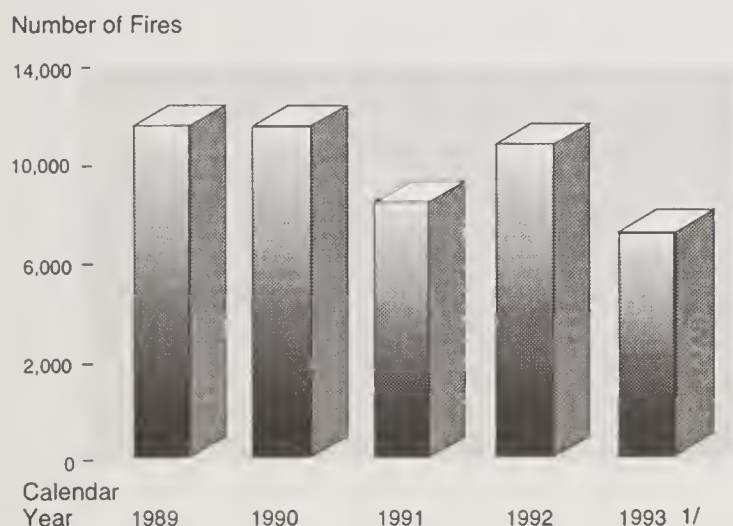
### Wildfires on the National Forest System

In FY 1993, due to a wetter than normal summer, fire activity was well below normal except in the desert areas of the Southwest (figure 25).

Accomplishment highlights include:

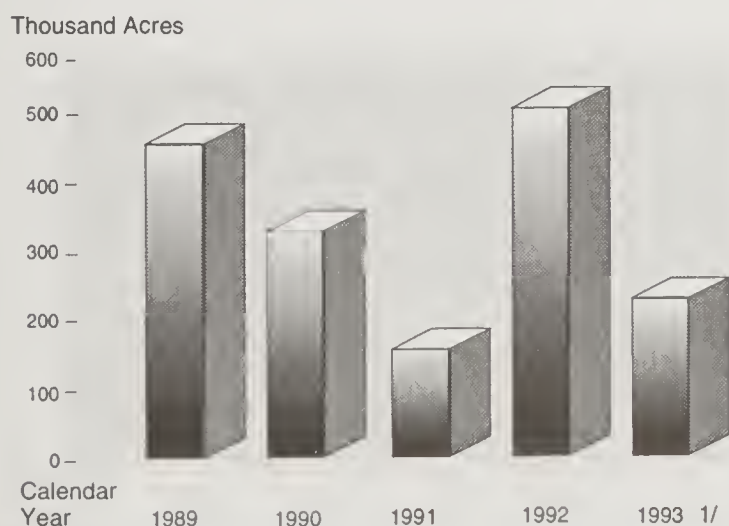
- Fought 6,917 fires that burned over 238,625 acres on National Forest System lands (figure 26)

Figure 25.  
Number of Fires on the National Forest System



1/ Preliminary figure.

Figure 26.  
Acres Burned by Wildfire on the National Forest System



1/ Preliminary figure.

and provided firefighting assistance to other Federal and State organizations through interagency agreements.

- Mobilized National Incident Management Teams for nine incidents, well below the 5-year average of 24 incidents. Overhead mobilized by National Interagency Fire Center (NIFC) totaled 734 individuals. Crews mobilized by NIFC totaled 275.
- Provided national leadership in the integration of cooperative fire protection programs and National Forest System fire efforts during critical fire emergency situations.
- Implemented a system to fund wildland firefighting resources in an economically efficient manner while maintaining an effective and productive response to fires.
- Authorized approximately \$4 million (figure 27) in severity funding, which provided for additional initial attack resources during periods of drought, resulting in lower suppression costs. In addition, an estimated \$184 million (figure 28) were made available for emergency firefighting.

### Presuppression

The Forest Service presuppression program includes maintenance and protection of lookouts, aerial detection and fire prevention patrols, engines, crews, aircraft, dispatchers, and firefighting equipment.

Accomplishment highlights include:

- Maintained 18 national interagency incident management teams and 7 major fire caches.

Figure 27.  
Fighting Forest Fires—Severity Authorizations

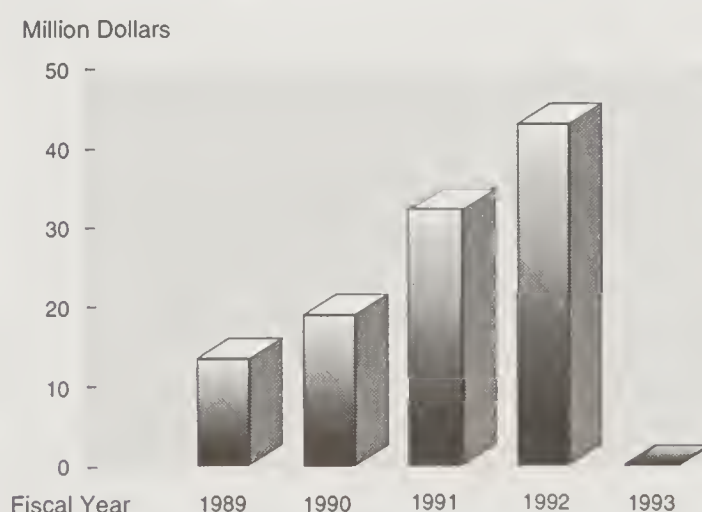
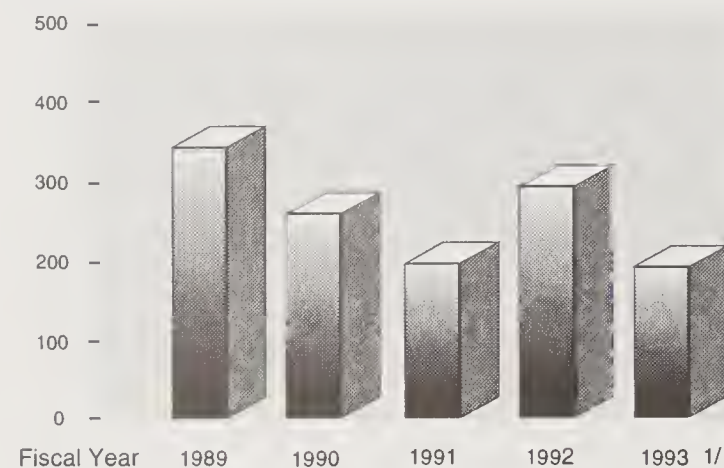


Figure 28.

**Fighting Forest Fires—Emergency Expenditures 1/**

Million Dollars



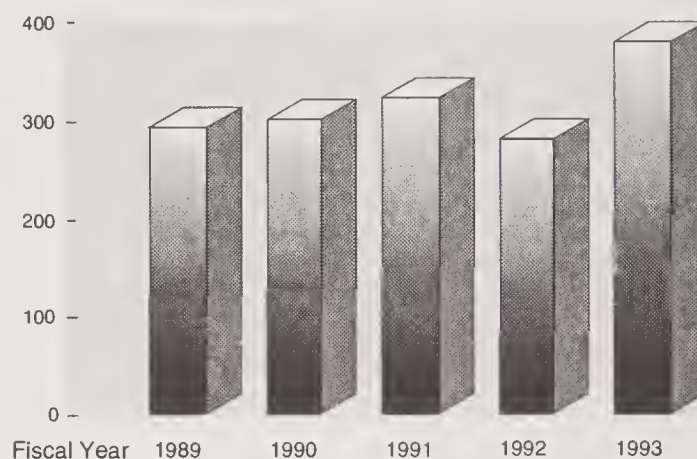
1/ Includes severity authorizations (preliminary figure).

- Trained over 500 students in "graduate level" resource management courses at the National Advanced Resource Technology Center (NARTC). Advanced training for National Incident Management Teams, lands, minerals, aviation, fire and watershed was also accomplished.
- Generated consistent standards and policies for equipment, training and incident management organizations in the National Wildfire Coordinating Group (NWCG).
- Initiated a project to revise the incident command system training package in coordination with the NWCG. Seventeen modules have been written to make the curriculum appropriate for use by other emergency agencies. These are being tested in New Mexico and New Jersey.
- Negotiated and executed an interagency agreement to design, develop, and implement a national automated information management system for incident management. The coordinated systems approach was implemented at a significant savings to the Government.
- Completed fuels management on more than 385,000 acres (table 14, figure 29).
- Began the development of a new, safer parachute system for smokejumpers.
- Coordinated a multiagency effort to develop methods to reduce the health effects of smoke on wildland firefighters.

Figure 29.

**Acres of Fuels Treatment Accomplished—National Forest System**

Thousand Acres



- Promoted a wide variety of training packages, publications, videos, and other media to transfer the newest wildland firefighting technology to all wildland firefighting agencies.

**Aviation**

Accomplishment highlights include:

- Provided active coordination with Departments of Transportation, Defense, State, Justice, and Commerce to develop national policy preventing unlawful use of aircraft both in the United States and internationally.
- Focused on ways to improve operations and reduce aircraft accidents, thereby saving lives and reducing costs.
- Completed an aviation activity review in the Southern Region and an analysis of operational helicopter uses on large fires.

**Forest Pest Management**

Forest pest management activities on the National Forest System are under the leadership of the State and Private Forestry Deputy Area of the Forest Service. They are directly coordinated with cooperative pest management activities to provide protection from insects and diseases on all Federal and non-Federal lands.

In FY 1993, detection and evaluation surveys were completed on 114 million acres of Federal lands.

Aerial and ground surveys detected and evaluated vegetation damage or pest populations on 80 million



acres of the National Forest System. Survey findings, along with recommendations and advice about suppression needs and available alternatives, were provided to the managers of affected lands.

In FY 1993, prevention and suppression activities protected 1.5 million acres of National Forest System lands from gypsy moths, southern pine beetles, dwarf mistletoes, and other insects and diseases. This includes 2 million acres of trapping for gypsy moths following the previous year's eradication project in the Pacific Northwest.

The RPA of 1974, section 3(e), requires that the use of pesticides on the National Forest System be reported annually (table 15).

## Forest Management

Forest management on the national forests includes inventory of forest resources, reforestation, care of forest vegetation, and harvest of trees in a manner that ensures environmental quality and meets a variety of forest plan objectives for ecosystem management, including wood products, wildlife habitat, water quality, and recreation settings.

### Forest Vegetation Resource Inventory

Forest vegetation resource inventories provide information needed to compile land classification, determine timber volume, and monitor growth rates. Information is also gathered for land and resource management plans, and to provide a measure for evaluating changes during the planning period. In addition, this information is used for research publications and for the national assessment program required by the RPA. In FY 1993, the Forest Service inventoried more than 16,500 million acres.

### Silvicultural Examinations

Silvicultural examinations provide data on existing ecological habitat, tree stand conditions (age, size, health, and vigor), and capabilities, growth, and mortality trends on a given site. Data from examinations are used to develop site-specific, integrated resource prescriptions to meet forest plan objectives. In FY 1993, the Forest Service completed silvicultural examinations on 2.7 million acres.

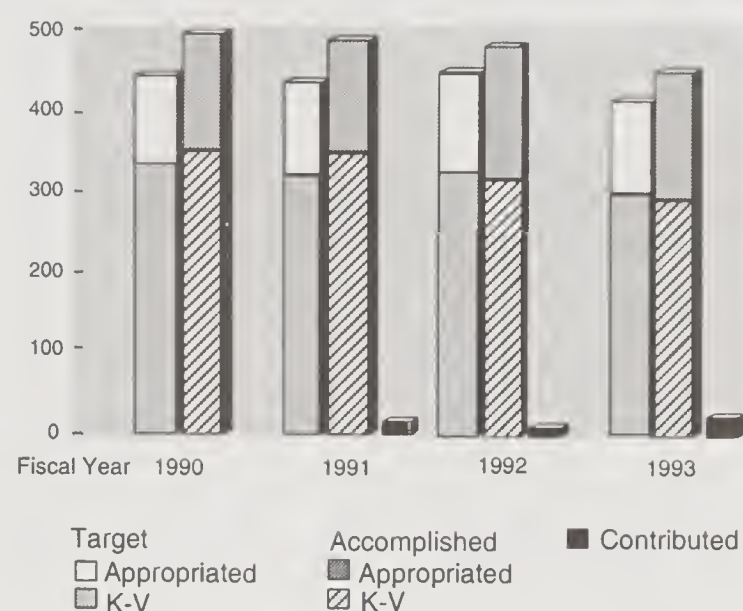
### Reforestation

Forest Service reforestation continues at a high level. In FY 1993, the Forest Service reforested 474,000 acres (figure 30). This level of reforestation meets the need to rehabilitate the large amount of acres that were burned from FY 1987 to FY 1989 in order to meet the program objectives outlined in the 1990 RPA Program. Appropriated, Reforestation Trust, and carryover funds refor-

Figure 30.

### Reforestation

Thousand Acres



ested 159,312 acres; 21,889 acres were reforested with contributed funds; and Knutson-Vandenberg Act funds reforested 292,921 acres (table 16). Planting and direct seeding occurred on 266.7 thousand acres and the rest, 207.4 thousands acres, was naturally regenerated.

The 1990 RPA Program projects a 16-percent decrease (base year 1990) in reforestation by 1995, with a slight rise between 1995 and 2040 but still less than 1990 levels. Over the past 5 years, an average of 90 percent of all reforestation has successfully met stocking objectives. Understocked plantations are replanted to ensure adequate levels. In FY 1993, understocked acres on the national forests needing reforestation totaled 978,659 acres, a decrease of 90,797 acres from FY 1992 (tables 17 and 18). Table 19 displays reforestation acres by States and national forests, certified as being satisfactorily stocked; table 20 displays the same information by region.

### Tree Nursery and Genetic Resource Operations

In FY 1993, 10 Forest Service nurseries produced 114.4 million seedlings for reforestation: 110 million bareroot and 4.4 million container seedlings. Contracts with State and private nurseries supplied the Forest Service with an additional 21 million seedlings.

The three major goals of the genetic resource program are to: (1) provide leadership and expertise for incorporating genetic principles into ecosystem management; (2) provide appropriate genetic materials to restore, maintain, and enhance genetic quality; and (3) sustain and/or increase diversity, productivity, and



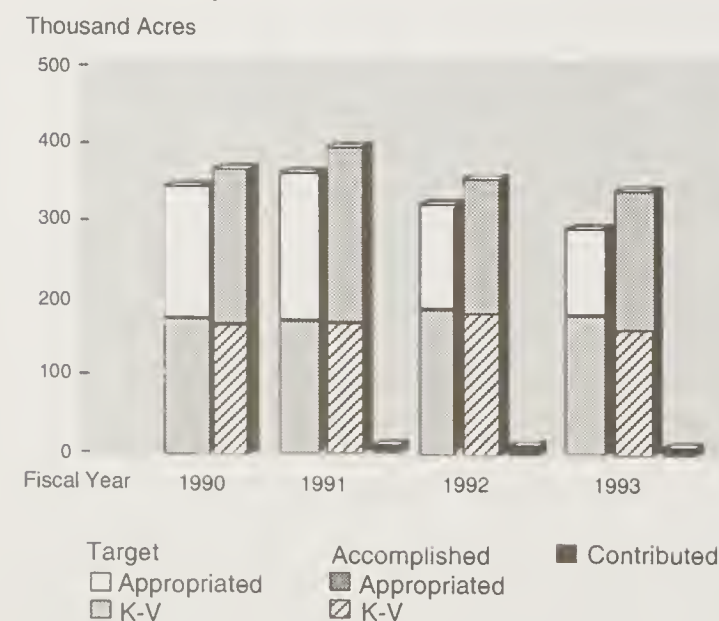
To improve tree growth characteristics and disease resistance, the Forest Service maintains a tree improvement program. Seeds are collected from selected national forest trees that have natural superior growth or disease resistance, and from tree seed orchards that produce genetically superior seedlings. These are used for outplanting on the national forests.

Timber yields are increased on national forests reforested with genetically improved planting stock. The 5,720 pounds of seed harvested from seed orchards in FY 1993 represented 17 percent of the total seed collected by the Forest Service. During FY 1993, 16 percent of the acres planted on the national forests were planted with seedlings grown from seeds obtained from seed orchards.

### Timber Stand Improvement

The 1990 RPA Program projects a 12-percent decrease (base year 1990) in timber stand improvement by 1995, with treatment acres projected to begin rising slightly after 1995 (still below 1990 levels) and then gradually decreasing toward the year 2040. In FY 1993, timber stand improvement treatments were applied to a total of 344,000 acres (table 21, figure 31). Appropriated and carryover funds were used for treating 175,680 acres; contributed funds treated 2,565 acres; and Knutson-Vandenberg Act funds treated 165,828 acres. Timber stand improvement treatments are needed on an increasing number of acres to meet multiple-use management objectives and growth expectations in support of forest plans. Timber stand improvement treatments were needed on a total of 1,384,974

Figure 31.  
Timber Stand Improvement



acres by the end of FY 1992, increasing to 1,414,922 acres at the end of FY 1993 (tables 22 and 23).

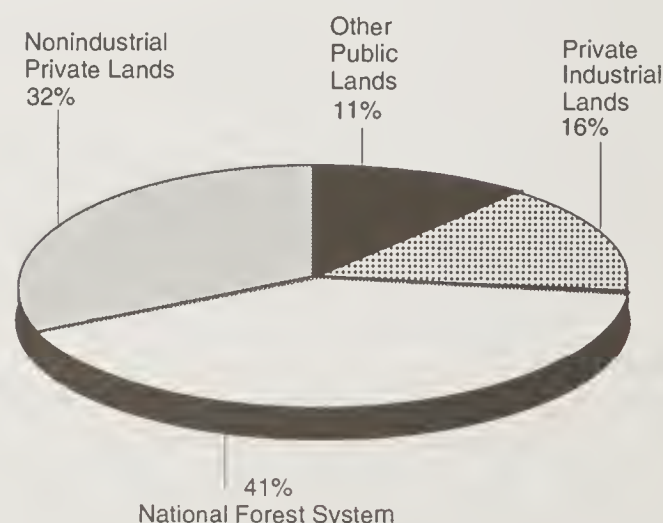
### Timber Sale Preparation, Offering, and Harvest

The National Forest System contains 41 percent of the Nation's standing softwood sawtimber inventory (figure 32). Overall, the National Forest System provided 12 percent of the total wood volume harvested in the United States in FY 1992 (the last year for which data was available). However, of the Nation's softwood sawtimber volume used for lumber in FY 1993, the National Forest System contributed approximately 14 percent. The remaining U.S. wood volume sources derived 49 percent from nonindustrial private forest lands, 33 percent from lands owned by industry, and 6 percent from other public lands (figure 33). In FY 1993, the total timber volume harvested from national forests was 5.9 billion board feet, a 19 percent reduction from FY 1992.

In FY 1993, the Forest Service sold 4.5 billion board feet (0.85 billion cubic feet), including volume offered in FY 1992 that was sold in FY 1993. The Forest Service offered 4.6 billion board feet (0.87 billion cubic feet) for sale in FY 1993, which is 65 percent of the funded target of 7 billion board feet (1.32 billion cubic feet) of timber offered for sale. The decreased level of volume offered was due to Forest Service management actions in response to environmental concerns about old-growth forests, the northern spotted owl, the red-cockaded woodpecker, and actions related to administrative appeals and litigation.

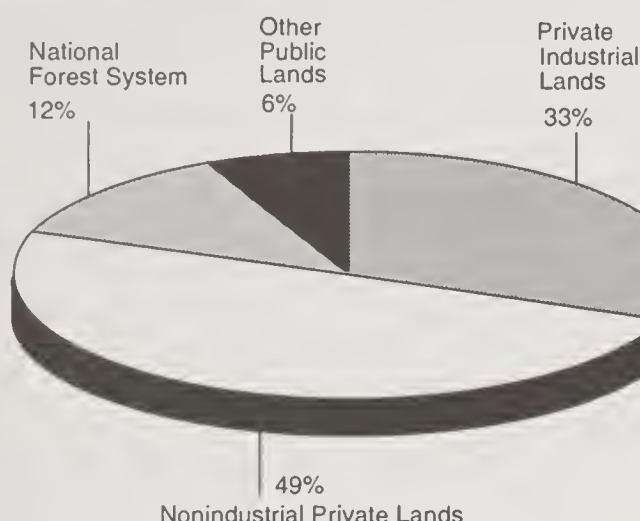
The 1990 RPA Program projects a 3-percent decrease (base year 1990) in timber offered by 1995, with offer levels projected to rise 8 percent between 1995 and

Figure 32.  
Inventory of Standing Softwood Sawtimber  
by Ownership—FY 1993 1/



1/ Taken from "Forest Resources of the United States, 1992." General Technical Report RM-234, the latest data available in FY 1993.

Figure 33.  
Percentage of Total Annual Wood Harvested from  
Lands in the United States—FY 1993 1/

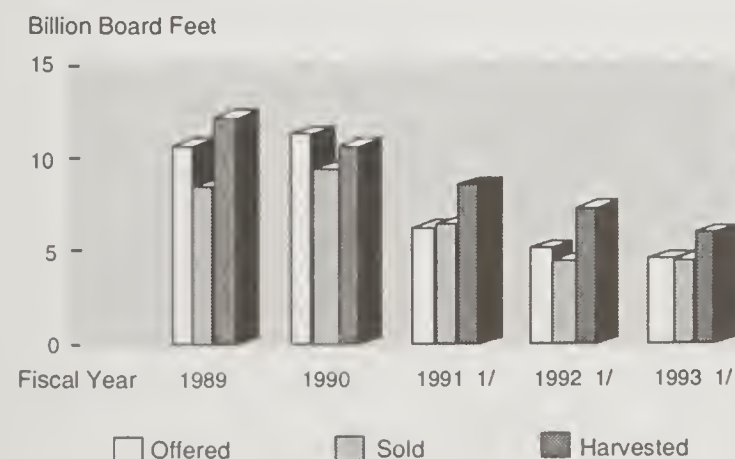


1/ Taken from "Forest Resources of the United States, 1992." General Technical Report RM-234, the latest data available in FY 1993.

2040. Sale volume includes green timber, salvage timber, and firewood. Figure 34 displays the total timber offered, sold and harvested; figure 35 displays the timber offered, sold, harvested and under contract by region. See tables 24, 25, 26, and 27 for more detailed information about timber sales. Table 28 displays, by region, uncut timber volume under contract. Funding levels for the Forest Service timber sale program are displayed in table 29.

Emphasis is being placed on increasing the cost efficiency of the timber sale program. The Timber Cost Efficiency Study was completed April 16, 1993, resulting in the National Timber Cost Efficiency Action

Figure 34.  
Timber Offered, Sold, and Harvested



1/ Since completion of the 1990 RPA Program, increased protection of threatened and endangered species such as the northern spotted owl and the red-cockaded woodpecker, and increased protection of old-growth and watersheds, have resulted in less timber offered and awarded than proposed in the 1990 RPA Program.

Plan, a multi-year program to control future costs and improve efficiency in the timber program. The action plan identifies specific actions, such as designing the most efficient work force for each unit based on potential timber offer levels. The Forest Service will use this action plan to improve cost efficiencies in FY 1994.

In FY 1993, the Forest Service remained committed to reducing the use of clearcutting as a standard commercial timber harvest practice on the national forests. Clearcut acres and the percentage of total harvest from clearcutting continued to decline from historic highs in the 1980's. In FY 1993, a total of 732,463 acres were harvested. Clearcutting totals for FY 1993 were 132,674 acres, representing 18.1 percent of the total harvest acres. This percentage clearcut is down from the 21.5 percent of total harvest acres reported for FY 1992. This is an even faster decline in the percentage clearcut than proposed in the 1990 RPA Program.

### Salvage Sale Program

Recent salvage sale offerings resulted from catastrophic fires in the West and Intermountain areas, insect epidemics in the Rocky Mountains and portions of the South, the continued rehabilitation of drought-affected areas in the Sierra Nevada Mountains, and other catastrophic events. Salvage sale revenues cover preparation and administration costs of sales and the associated road engineering costs.

The salvage sale program continues to comprise a large portion of the overall timber sale program. In FY 1993, the Forest Service sold 1,906 million board feet (368 million cubic feet) of salvageable timber. This volume is part of the total FY 1993 timber sale volume. Under the special salvage timber sale program, small timber operators (those with fewer than 25 employees) purchased approximately 4 percent of the salvage sales.

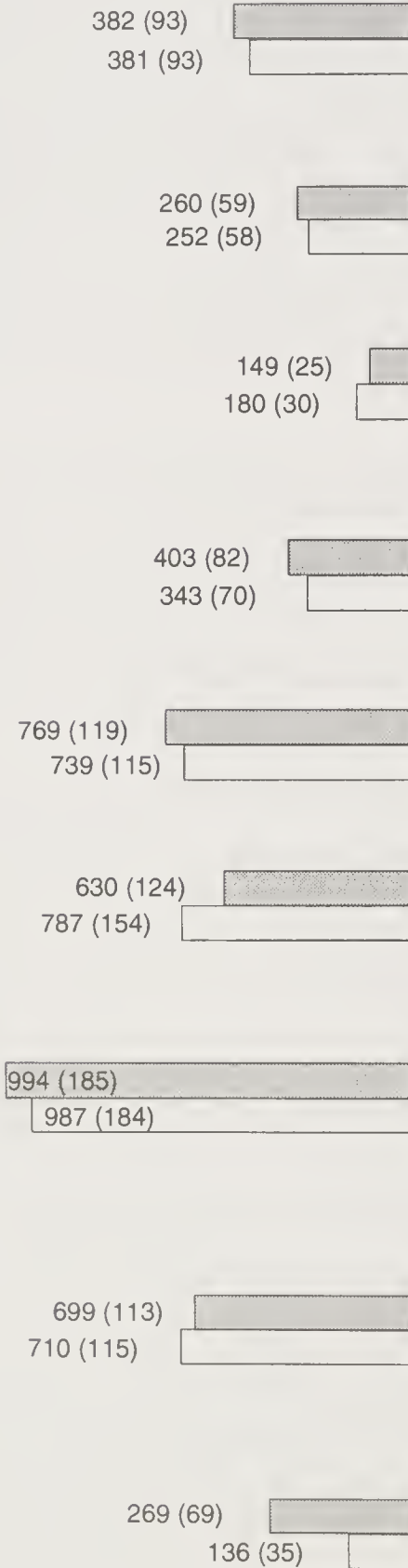
### Timber Sale Program Information Reporting System (TSPIRS)

The NFMA of 1976, section 6(1), requires the Forest Service to estimate the long-term costs and benefits of the agency's timber program. Prior to the development of TSPIRS, this requirement was met through the analysis of a sample of timber sales. TSPIRS more completely meets the section 6(1) requirement by providing the expenses and returns to the Government from all national forest timber sale programs. The reporting system's official results are displayed in the FY 1993 Timber Sale Program Annual Report. This report is provided annually to Congress and includes information on timber sale program finances, economics, and employment effects. The report is available upon request from the Chief of the Forest Service.

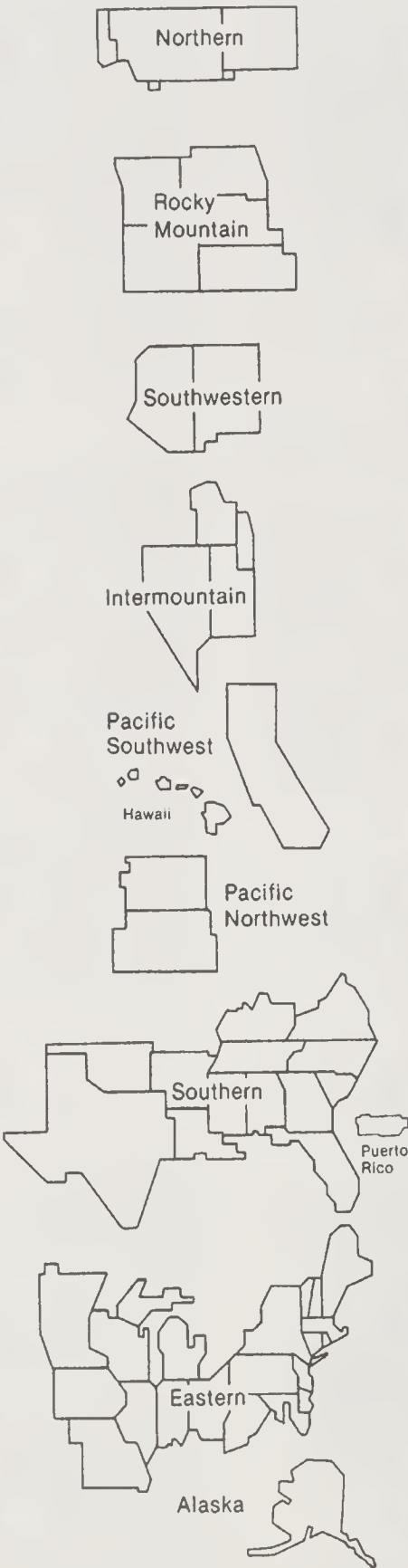
Figure 35.

**Timber Offered and Sold - FY 1993**  
Million Board Feet (Million Cubic Feet)

Offered  
Sold

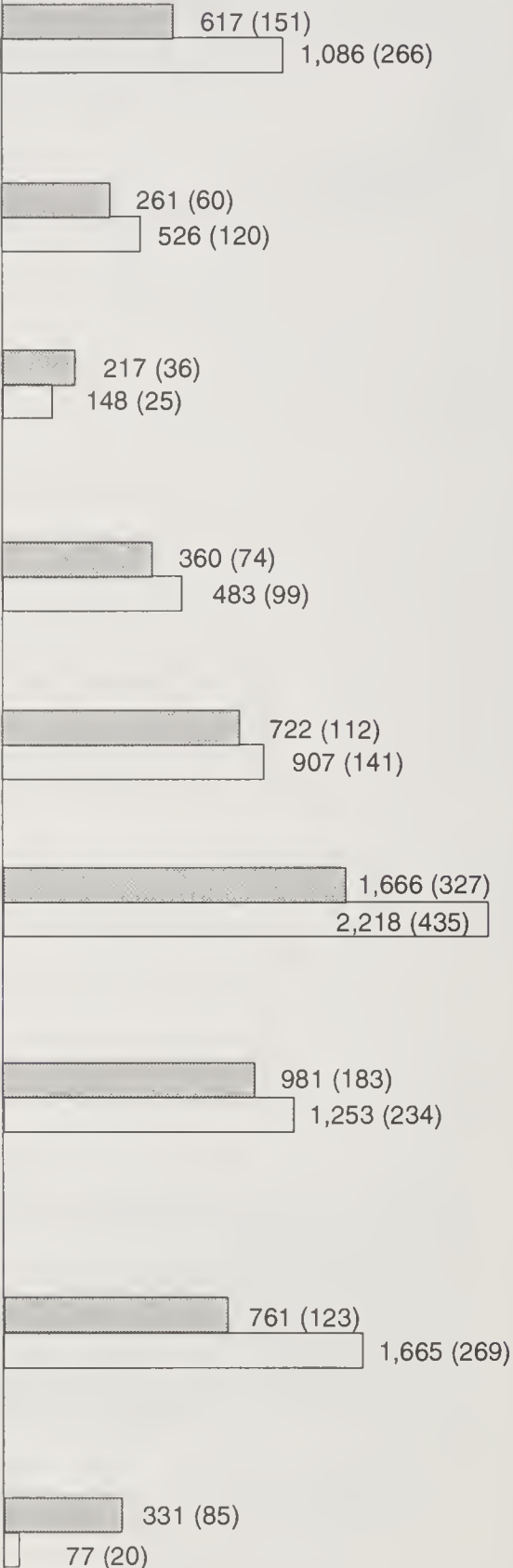


**Region**



**Timber Volume Harvested and Under Contract - FY 1993**  
Million Board Feet (Million Cubic Feet)

Harvested  
Volume under contract



Total Uncut Timber Under Contract—8,363 Million Board Feet (1,609 Million Cubic Feet)



### Cubic Measurement

Cubic measurement is a consistent and constant unit of measure which is simpler and fairer than the board-foot unit. It reduces sampling and measuring costs of standing and harvested timber.

The Forest Service is moving away from the board-foot unit of measure, and toward the use of cubic measurement. In the transition, the regions within the Forest Service are preparing and advertising timber sales using both the board-foot and cubic units of measure; this allows purchasers to become familiar with cubic units of measure. A cubic rules committee continues to propose revisions to the cubic scaling rules that reflect measured volume of all products in harvested trees; the target publication date for the Cubic Scaling Rules Handbook revision is FY 1995.

### Tree Measurement Timber Sales

Tree measurement timber sales are sales that are offered, sold, and paid for on the basis of presale timber volume cruises. This method of sale is in contrast to timber sales which are offered and sold on the basis of cruise volumes, but paid for on the basis of post-removal scaling of harvested timber.

The Forest Service is shifting the majority of the timber sale program to tree measurement in order to reduce timber theft associated with the timber scaling portion of the program. Scaling done on future timber sales will be accomplished by Forest Service scalers or by scalers contracted directly by the Forest Service.

### Special Forest Products

The national forests offer users a wide variety of other forest products. Round wood products such as house logs, poles, posts, and fence rails are provided for commercial or personal purposes on an individual piece basis or per linear foot. Bolts of cedar and other rot-resistant species that can be split into roofing shingles are sold by the cord.

There is popular demand for Christmas trees, both cut and dug, for later planting and for the traditional recreation experience. Christmas trees and "wildings" used in landscaping are sold on an individual tree basis. Cedar boughs are sold by the ton, as are various ferns and evergreen brush species used by the floral industry. Some national forest products such as pinyon nuts, jojoba beans, bear grass, and mushrooms are sold by the pound. The bark of several tree species such as the cascara tree and Pacific yew, which is used for medicinal purposes (see below), is sold by weight. Sap tapped from the trunks of various tree species is sold by the gallon for such diverse products as naval stores, maple syrup, and spruce gum. Dried cones used for decorative purposes are sold by the sack or by the bushel.



For many people, gathering firewood provides not only an energy alternative but also an enjoyable outdoor recreation experience. Firewood is measured, appraised, and sold in standard 128-cubic-foot cords, containing about 80 cubic feet of wood. The firewood sales program works on a charge system designed to cover administrative and management costs. In FY 1993, the national forests provided 889,000 cords of firewood at a value of \$4.1 million for personal use. This volume is part of the total FY 1993 sale volume.

### Pacific Yew—A Source of the Drug Taxol

While excellent progress continues to be made producing the anticancer drug taxol from precursors extracted from needles of English yew (*Taxus baccata*), taxol extracted from Pacific yew (*Taxus brevifolia*) bark is still the only approved source for the drug.

FY 1993 harvest of Pacific yew bark from national forests was approximately 675,000 pounds green weight, or less than half the amount collected in FY 1992.

The Pacific Yew Final Environmental Impact Statement was published in September 1993. It provides a strategy for harvesting Pacific yew for the next 5 years on national forests and lands administered by the BLM.

### Rangeland Management

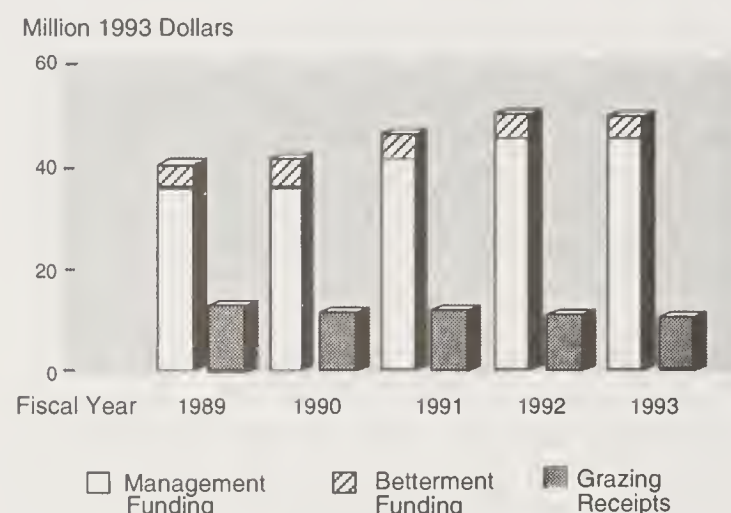
The Forest Service manages over 97 million acres open to grazing by permitted livestock in 33 States. In addition to its use for livestock grazing, healthy rangelands provide quality wildlife habitat, stable soils, clean and abundant water, and recreation opportunities.

FY 1993 was the second year for the "New Measures" system of analyzing accomplishments in range management. This system monitors progress toward achieving

forest plan objectives for rangeland ecosystems while maintaining a record of permitted livestock grazing.

In FY 1993, the Forest Service administered 9,343 paid permits for 9.8 million head months (HM's) of permitted grazing by domestic livestock (see tables 30, 31, and 32). The range program was funded at \$49 million (including the Range Betterment Fund) in FY 1993 and returned \$10.5 million to the Treasury from grazing fees (figure 36). HM's of permitted grazing continue to decline as forest plans focusing on a balance of resource values and outputs are implemented. In striving to manage complete rangeland ecosystems, emphasis for FY 1993 was on corrective measures for grazing allotments with declining or overstocked conditions.

Figure 36.  
Range—Funding and Receipts



Management is often the key to achieving or maintaining satisfactory range condition. In FY 1993, 3,288 structural range improvements such as fences and water developments were installed to improve livestock management on forest lands. This exceeded the goal by 1,146 structures. Emphasis was on allotments where improvements would reduce unsatisfactory range conditions.

As part of the continuing "Change on the Range" philosophy, measures on acres suitable for livestock grazing have been replaced with measures reflecting the condition of the total rangeland ecosystem. Of the total 97 million acres where grazing is authorized by permit, 74.3 million acres have range management objectives in the forest plans (table 33). Following applicable forest plan standards and guidelines, forest plan range management resource objectives were achieved on 25.4 million of the 74.3 million acres, largely through management of livestock. An additional 22.1 million of the 74.3 million acres were moved

toward meeting forest plan objectives. In order to meet forest plan objectives, approximately 11 million of the 74.3 million acres need revised Allotment Management Plans. Approximately 15.8 million of the 74.3 million acres are currently being evaluated to determine their status.

Knutson-Vandenberg (K-V) Act funds covered the costs of approximately 17 percent of all structural and 20 percent of all nonstructural improvements. Knutson-Vandenberg funds are timber sale revenues spent on range improvements done within timber sale boundaries. In addition, the Forest Service accomplished 85 high-priority structural improvements and 259 acres of forage improvement with labor, funds, and materials donated by cooperating permittees, other agencies, and volunteers.

Efforts to control noxious weeds infesting National Forest System lands continued. Weeds negatively affect many resource conditions and characteristics. The control of noxious weeds requires coordinated efforts by all landowners in an infested area. In FY 1993, local weed control districts and the Forest Service worked together to treat 42,814 acres of National Forest System lands. This exceeded the targeted accomplishment by 15,678 acres. Emphasis was on biological control measures.

In FY 1993, rangeland management reflected an ecosystem perspective emphasizing restoration and long-term health of rangelands, and more meaningful participation by people who share them. Riparian area restoration, watershed protection, maintenance of soil productivity, and improvement of rangeland condition ranked high in management priorities. Closer partnerships with rangeland users gave rise to creative new approaches aimed at promoting both ecological health and quality of life for rural families and communities.

A westwide effort was initiated to establish demonstration projects illustrating practical solutions to issues surrounding interaction between big game and livestock. Project proposals were solicited from across the West by a variety of governmental, wildlife, and livestock producer organizations, under the umbrella title, "Seeking Common Ground." A panel made up of the Forest Service, the BLM, the Wildlife Management Institute, the International Association of Fish and Wildlife Agencies, the Rocky Mountain Elk Foundation, the Public Lands Council, and the American Farm Bureau Federation was established to evaluate proposals from 11 States. A mix of government and private sources were used to fund 9 projects from over 40 proposals in FY 1993. On-the-ground accomplishments will be monitored and reported when fully implemented.



## Watershed and Air Management

The watershed and air management programs encompass soil, water, air, and weather program components. All components relate to the Forest Service emphasis on ecosystem management, since soil, water, air, and climate are key elements in properly defining and managing ecosystems.

### Watershed Improvements

This work includes a variety of activities, such as site revegetation, stream channel rehabilitation, soil stabilization, and restoration of gullies. Accomplishments are achieved through regular appropriations, Knutson-Vandenberg funds available from timber sales, and contributed funds, such as materials and labor from outside partners.

Since 1990, watershed improvement accomplishments have averaged 33,891 acres per year from all sources. While the accomplishments from appropriated funds have fluctuated annually, work completed from both Knutson-Vandenberg and contributed sources has gradually but steadily increased. The contributed acreages reflect increased partnerships from a variety of groups and individuals.

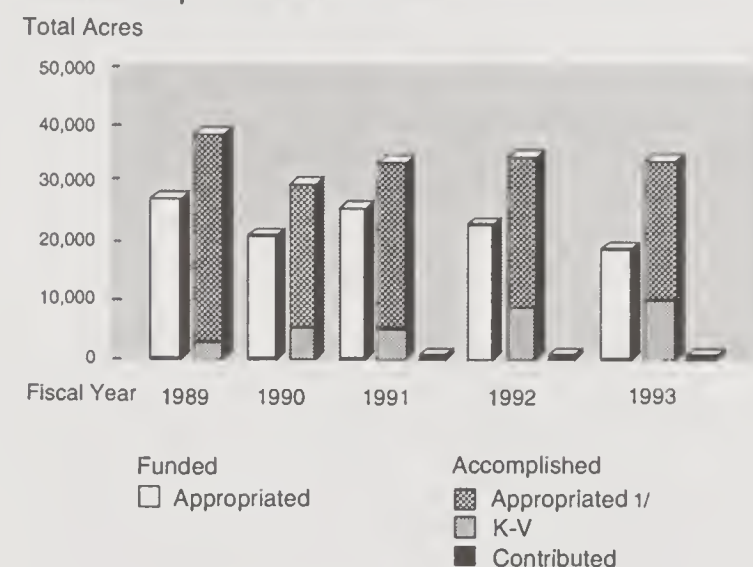
The FY 1993 target from appropriated funds was 19,159 acres of watershed improvements. Accomplishments achieved through Knutson-Vandenberg are based on yearly timber sale volumes and related improvement plans. Contributed sources are based on available opportunities with partners, so acres accomplished are in addition to those from planned budgets and Knutson-Vandenberg.

During FY 1993, a total of 24,119 acres of watershed improvements were accomplished using appropriated funds, exceeding planned targets by 25 percent; about 11,000 acres with Knutson-Vandenberg funds and 639 acres with contributed funds (figure 37). Related to watershed improvements are emergency improvement measures taken to counteract natural disasters that affect watershed and air resources. Emergency burned area rehabilitation was performed on 14,635 acres, while 30 acres received treatments to mitigate flood damages.

Typical results from these improvements include: decreased flood flows and volumes, increased base flows, improved water quality (such as less sediment or cooler water temperatures), increased wildlife and fish habitat, and decreased sediment filling of downstream reservoirs and irrigation works.

Figure 37.

### Watershed Improvements—Acres



1/ Includes excess timber receipts and other acres..

### Soil Resource Inventory

While soil resource inventory once encompassed only an inventory of soils, recent efforts include inventory of integrated knowledge of soils, vegetation, geology, landform, and climate. This activity is key in defining ecosystems for use in overall management programs.

Through FY 1992, the Forest Service had completed soil resource inventories on 65 percent of the National Forest System lands. At the current rate of accomplishment, the RPA Program goal of completing this inventory by the year 2000 will not be achieved. Soil resource inventories on 5.7 million acres were planned for FY 1993. This represents a slight decrease from the planned accomplishments of previous years. Of these, 5.4 million acres were inventoried, 94 percent of the targeted acreage.

During the year, several other key soils-related projects made important progress. The "National Hierarchical Framework of Ecological Units" was completed. In addition, studies monitoring soil quality and long-term productivity were continued, providing critical information on land management effects on soil resources.

Soil resource inventory data provide many of the basic building blocks needed to truly manage national forests and grasslands in an ecological context. Soils reflect the geology, climate, and vegetation that formed them in addition to giving many clues about past and current land uses. The maps and interpretations that result from this inventory help resource managers make informed decisions on many critical land management activities, such as locations for recreation areas, where and how



to use prescribed fire, which places are best for roads, how productive soils are for forage management, and many others. In many regions, soil resource inventories are evolving into true ecological inventories, combining soils, vegetation, climate, and other factors to help employees define and manage ecosystems at a variety of scales. A national ecological database is currently being developed to manage information derived from the ecological inventories.



### **Air Resource Management**

The Air Resources Program of the Forest Service has two main parts: (1) protecting sensitive areas from effects of air pollution; and (2) mitigating the effects of pollution generated by Forest Service activities. In the context of ecosystem management, both of these have taken on a new significance and emphasis.

Fire plays a crucial role in many of the ecosystems managed by the Forest Service. Air pollution results from both wildfire and prescribed fire. In some places where there has been active suppression of wildfires, there are changes in species mixes of trees and unnatural fuel buildups, causing much more intense wildfires and more damage to watersheds, soils, and air quality. Prescribed fires produce pollution as well, but generally much less than wildfires, and at times when the smoke would not affect populated areas. The Forest Service has initiated several studies to compare the historical emissions of air pollutants based on historical wildfires and prescribed burning to better understand what levels of fire are needed to maintain fire adapted ecosystems and what air pollution would result.

In FY 1993, three of the 88 Class I air quality areas managed by the Forest Service showed existing adverse effects of air pollution on water quality. The States

involved were officially notified of the Forest Service findings. The States have the lead in determining the appropriate additional studies and mitigations needed to remedy these conditions.

The Air Resources Program in the Northeastern States received the 1993 Chief's Stewardship Award. This award recognized a long-term effort to put the best science on air pollution effects into a useable format for managers, the use of that process in working with States and EPA, and the success in protecting large areas of land.

In FY 1993, over 50 Prevention of Significant Deterioration (PSD) of air quality applications were reviewed by Forest Service specialists across the Nation.

In terms of protecting sensitive areas, the Forest Service, in cooperation with the National Park Service, published the document "Lichens as Bioindicators of Air Quality" (GTR RM-224). This report provides field procedures, sensitivities of different species, and a review of case studies. In addition, the Center for Forest Environmental Studies initiated the collection of tree seeds from across the United States for growing and testing in laboratory chambers to determine their sensitivity to air pollutants.

### **Weather Program**

The Forest Service weather program supplies weather and climate data for resource management decisionmaking. Data from 375 remote automatic weather stations are now available through the weather information management system (WIMS), which became fully operational late in FY 1993. These data, along with interagency coordination of weather data and products, help ensure that resource managers have high-quality data for the increasing numbers of applications, such as fire management, that are key to proper ecosystem management.

### **Water Rights Adjudications**

In FY 1993, the Forest Service was involved in water rights adjudications in Idaho, Montana, Arizona, Nevada, Oregon, Utah, and several other Western States. The Forest Service has continued to prepare claims for consumptive water uses and instream flows in five regions for a variety of needs.

In FY 1993, the Stream Systems Technology Center (SSTC) was opened in Fort Collins, Colorado. It is managed through the Rocky Mountain Forest and Range Experiment Station. The SSTC was developed to expand knowledge of mountain stream systems, issue contracts for specific research products, and provide training and support to land managers.

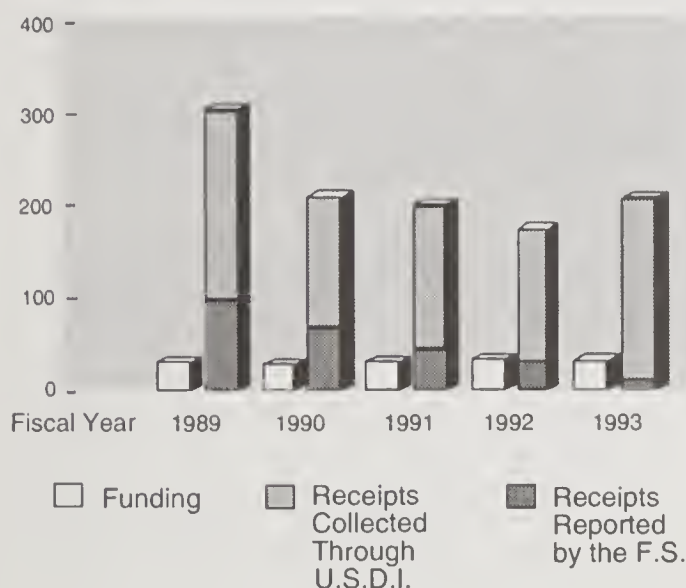
## Minerals and Geology Management

The components of the program include processing and administering proposals to explore, develop, and produce energy and mineral resources from National Forest System lands. The minerals and geology management program was funded at \$34.8 million in FY 1993 and returned \$209 million to the Treasury; \$197.3 million through U.S.D.I. and \$11.7 million by the Forest Service (figure 38). The program benefits the public by contributing to the supply of raw materials essential to our society and by providing employment and income, particularly in rural communities. It does so through five major program areas:

Figure 38.

### Minerals—Funding and Receipts

Million 1993 Dollars



- The mineral materials program includes sand, gravel, building stone, and other materials of considerable importance in meeting local construction, road building, and landscaping needs. Some of these materials are also important for environmental reasons such as municipal water treatment and removing sulfur gases from coal-fired electrical plants.
- The leasable minerals program includes oil and gas, coal, geothermal energy, phosphate, and other minerals specified in statutes. During FY 1993, National Forest System lands produced 10.5 million barrels of oil, 210 billion cubic feet of gas, 90 million tons of coal (the two largest coal mines in the country are within national forests), 95 percent of the domestic lead production, and over 5.5 million tons of phosphate (table 34). Approximately 3 million acres in national forests were leased in FY 1993.

- The locatable minerals program includes gold, silver, copper, zinc, tungsten, and other minerals available under the 1872 Mining Law. Mining in National Forest System lands creates jobs and increases local tax bases. There were an estimated 7,000 active mines within national forests during FY 1993.
- The reserved and outstanding rights program involves administration of private minerals underlying National Forest System lands. The Forest Service currently monitors and inspects approximately 12,000 private mineral operations each year primarily involving oil and gas wells.
- The geology program provides necessary information for planning and implementation of ecosystem management and restoration activities, and protection of ground water, cave, and fossil resources.

Program management is directed at ensuring operations are conducted in a manner consistent with long-term sustainability of ecosystems. During FY 1993, it is estimated that the Forest Service processed 3,800 proposals to conduct operations, and administered 12,700 active operations. The value of minerals produced from National Forest System lands in FY 1993 is estimated at \$4 billion.

Energy and mineral activity on National Forest System lands has been in a general decline during the past 20 years, except for selected commodities and occasional surges caused by events such as the technological improvement in processing gold ore that precipitated the Western States' gold rush in the late 1980's, and the temporary increase in oil and gas exploration during years in which there were oil embargoes. The continuing decline in mineral activities is due to a number of factors. Some of the more significant ones include:

- Lack of public support for development of minerals from the national forests;
- Difficulty in obtaining authorizations and in complying with requirements of Federal, State, and county agencies;
- Uncertainty as to whether and when production might be allowed (time frames for approval/denial decisions for larger projects often exceed 5 years);
- Significant capital expenditures before any assurance is given that development will be allowed, often including advance payment for environmental studies and other costs; and



- The global nature of the marketplace, which leads operators to redirect their capital to those countries offering supportive policies as well as commercial mineral deposits.

## Engineering

### Infrastructure

Forest Service infrastructure is the network of facilities, utilities, and transportation systems needed to meet public and administrative needs.

### Transportation System

Virtually all activities on National Forest System lands depend on the Forest Development Road System. Roads are managed in accordance with the land management planning process. They are constructed, operated, and maintained to the least-cost to achieve objective standards necessary to provide safe, economical, and environmentally acceptable access.

Recreation activities comprise the majority of use on forest development roads. The proportion of forest road program (FRP) funds spent on recreation and general purpose roads (roads which serve all users) has steadily increased over the past 3 years. Even roads which are initially constructed to access timber sales are used as access for recreation, wildlife habitat improvement projects, watershed projects, grazing allotments, mineral activities, fire prevention, and a host of other needs.

### Existing Road System

In FY 1993, the Forest Development Road System consisted of 369,385 miles of arterial, collector and local roads. Roads require two different types of maintenance: (1) that which results from use (road grading, spot gravel, etc.), and (2) that which is necessary, regardless of use, to maintain a safe travel way at the desired level of service (including roadside brushing, cleaning culverts and ditches, flood and slide repairs, sign replacement, etc.).

Many forests are meeting road maintenance needs and controlling costs by developing cooperative agreements with State, county, and local agencies.

During FY 1993, 25 percent of the road system was managed for use by passenger cars, 57 percent was managed for use by high-clearance vehicles (such as pickup trucks and four-wheel-drive vehicles), and 18 percent of the roads were closed to motorized traffic year round.

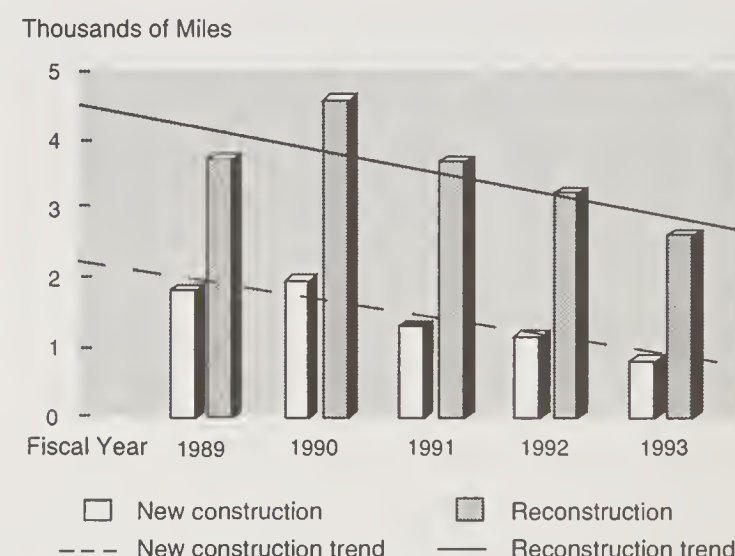
During FY 1993, the Forest Service spent \$81.9 million in Federal appropriations for road and bridge maintenance in support of administrative use and noncommercial forest users. A total of 152,067 miles of road

were fully maintained. The remaining 217,318 miles of road were maintained at a level less than adequate for current use.

As much as 45 percent of the funds used to maintain forest development roads has been contributed by timber purchasers. This contribution continued to decrease in FY 1993 as the amount of timber hauled over forest development roads declined. Road maintenance costs by State are shown in table 35.

Reconstruction of forest development roads is necessary to maintain or improve level of service, improve public safety, and improve environmental protection. Road reconstruction, by State, for appropriated funds, purchaser credits, and purchaser election funds are shown in tables 36 and 37. A summary of planned versus accomplished miles of reconstructed roads is shown in figure 39.

Figure 39.  
**Road Accomplishment Trends—Construction and Reconstruction**



In FY 1993, 2,625 miles of existing forest development roads were reconstructed, 160 miles more than targeted. This is a decrease from FY 1992, when 3,259 miles were reconstructed. The downward trend in reconstruction is shown in figure 39. This decrease is mainly due to the decline in the amount of timber harvested.

In FY 1993, 2,133 miles of road no longer needed to manage the national forests were obliterated, and the land was restored for vegetation.

### Newly Constructed Roads

During FY 1993, the Forest Service constructed 816 miles of new road, 156 miles less than planned for the year. This is the third consecutive year that miles of new road construction have decreased. A summary of

planned versus accomplished miles can be found in figure 40. The decrease in purchaser credit program mileage is consistent with the decrease in timber sale volume. Miles of road constructed and reconstructed with Forest road program funds were within 1.0 percent of that planned.

### Bridges

In FY 1993, National Forest System lands had over 7,600 road bridges on the Forest Development Road System, and approximately 3,000 trail bridges. The bridge operation and maintenance program includes regular inspection, load capacity rating, and posting of restricted bridges in accordance with Federal Highway Administration standards. Bridge inventories indicate that 1,470 road bridges (19 percent of the total) are structurally deficient or functionally obsolete.

In FY 1993, 32 new bridges were constructed, and 46 bridges were reconstructed or rehabilitated. This included 35 bridges having timber for the primary structural component. Bridge construction and reconstruction, by State, with appropriated dollars and with purchaser credit, are shown in table 36.

In FY 1993, the Forest Service implemented a bridge and major culvert data base. This will consolidate recordkeeping and streamline reports to the States for inclusion of Forest Service bridges in the National Bridge Inventory.

### Building Construction/Reconstruction

Facility needs continue to grow as facilities age. Maintenance funding and construction dollars remain nearly constant, and additional requirements must be met for access, energy conservation, etc. In addition to appro-



*The Smith Rapids Bridge on the Chequamegon National Forest was a bridge replacement project. Designed by Forest Service engineers and constructed by a Native American corporation, Smith Rapids utilizes and 1820 design and 1990's technology. This structure received an Engineering Achievement Award from the Wisconsin Chapter of the American Society of Civil Engineers for innovations in design and use of timber construction materials*

priations, forests used their minor construction authority to renovate and construct buildings from benefiting program funds.

The Forest Service administers buildings that provide approximately 25 million square feet of space on 852

Figure 40.

#### FOREST SERVICE ROADS PROGRAM SUMMARY OF PLANNED VS. ACTUAL ACCOMPLISHMENTS FOR FY 1993

Funding Source 1/	Construction Miles (New Roads)		Reconstruction Miles (Improved Existing Roads)	
	Planned	Accomplished	Planned	Accomplished
PCP	852	747	1,947	2,175
PEP	57	25	167	79
FRP & TTSP	63	44	352	371
Total	972	816	2,466	2,625

1/ Funds for forest road construction and reconstruction come from several sources. The Purchaser Credit Program (PCP) allows timber purchasers a credit against the price of the timber they buy equal to the cost of the roads they construct or reconstruct to harvest timber. The Purchaser Election Program (PEP) allows purchasers qualified as small businesses to have the Forest Service build the roads using funds from timber receipts. The Forest Road Program (FRP) finances the construction and reconstruction of recreation, general purpose, and some timber access roads from appropriated funds. FRP finances engineering, right-of-way, and administrative support for all road construction and reconstruction done under PCP, PEP, and FRP. FRP also finances the environmental studies and interdisciplinary professional analysis associated with road construction activities.



administrative units; 13 percent of the buildings are leased.

The appropriation for construction of fire, administrative, and other facilities for FY 1993 was \$10.3 million. The appropriation for construction and maintenance of research facilities was \$3.6 million. In FY 1989, the facility construction and reconstruction accumulated needs were estimated to be \$373 million.

### **Building Maintenance**

A major part of the maintenance program continued to be the identification and management of asbestos and the identification and reduction of radon levels to meet health and safety standards.

Accessibility surveys were conducted during FY 1993. Where possible, corrective action was taken to make the buildings accessible. Work continued to provide equal facilities for both genders.

The maintenance appropriation for fire, administrative, and other facilities remained nearly constant in FY 1993, at \$26.5 million. The Forest Service also received \$6.6 million in rent receipts to maintain quarters. The FY 1993 maintenance funds amounted to approximately \$2,000 per building. Heavy demands continued to be placed on limited maintenance resources due to the age of the buildings and new standards. The maintenance backlog is estimated to be \$91 million in FY 1993.

In an effort to stretch construction and maintenance funds, the Forest Service continued to utilize Job Corps personnel, prison crews, and volunteers to maintain and construct facilities, where appropriate. Maintenance funds were also used to comply with the Energy Policy Act of 1992 and building code requirements and to address indoor air quality, lead-based paint, and historic structures.

### **Dam Safety Management**

The Forest Service, in cooperation with permittees and State officials, conducted regular safety and maintenance inspections as an essential part of dam safety management. The Forest Service manages over 1,000 dams and administers permits for another 2,200 dams owned by others, but located on National Forest System land. Inspections, maintenance, and repair of Forest Service dams are funded from the benefiting activity such as recreation, wildlife, and watersheds. Managed and permitted dams were modified as a result of these safety inspections.

In FY 1993, the Forest Service completed implementation of a database for tracking and reporting information to the National Inventory of Dams.

### **Equipment Management**

The Forest Service owns and operates approximately 17,000 motor vehicles and 2,000 pieces of specialized equipment. This number represents a 6-percent increase over FY 1992 due to the replacement of leased and rented vehicles with less costly agency-owned vehicles. These motor vehicles traveled over 150 million miles during FY 1993.

In FY 1993, to help promote energy conservation, the Forest Service acquired 30 alternatively fueled vehicles (AFV's). Seventeen of these vehicles replaced gasoline-powered vehicles; the balance were Forest Service-owned vehicles converted to run on an alternative fuel.

The Forest Service chose fuel types based on the commercial availability of fuel in the area the vehicle was stationed. Despite some limitations in range of travel, this technology proved quite promising. Forest Service intends to pursue it further in FY 1994.

### **Federal Facilities Compliance Program**

The Federal Facilities Compliance Program brings federally owned and operated buildings and sites into compliance with several laws and executive orders established to protect public health and the environment.

The Forest Service reports annually to the EPA on progress with identified projects. Most of these projects are long-range in nature, involving several years of monitoring before and after mitigation. The Forest Service identified 1,046 projects in FY 1993 to bring its buildings and sites into compliance.

In FY 1993, the Forest Service reported progress on 865 projects, ranging from preliminary planning and design to full completion. Included in these projects were radon and asbestos mitigation, which is now approximately 50 percent complete for all Forest Service facilities, pollution abatement projects, watershed protection, underground fuel storage tank remediation, site investigation and testing for hazardous wastes, and mitigation of environmental problems at inactive and abandoned mines and sanitary landfills.

## Technology and Development in Support of Resource Programs

The technology and development centers in Missoula, Montana, and San Dimas, California, are responsible for developing and implementing promising new technologies in partnership with private industry and other Government agencies. The following are selected examples of technologies explored and tested in FY 1993:

- The San Dimas Technology and Development Center (SDTDC) has developed, in conjunction with a laser manufacturer, a low-volume road survey method using a laser; a prototype garbage bin which is animal resistant and accessible to persons with disabilities; and, through a partnership with the Motorcycle Industry Council, has conducted field tests to monitor noise levels in newer model motorcycles.
- The Missoula Technology and Development Center (MTDC) provided meteorological monitoring for the gypsy moth eradication program along the Wasatch Front in Utah. The MTDC, in cooperation with Oklahoma State University, has also perfected a method of automating the labor-intensive quality control procedures for grading seedlings at Forest Service bare-root nurseries.

## Mapping and Digital Spatial Data

The program goal is to support Forest Service management by providing essential maps and related products.

During FY 1993, the Forest Service and the U.S. Geological Survey (USGS) signed an interagency agreement for a single-edition quadrangle map. Under the new agreement, the Forest Service is responsible for maintaining those maps that fall in the agency's area of interest (approximately 10,500 maps, nearly 20 percent of the total maps in the series). USGS will provide color printing and distribution of the map product. This agreement will reduce duplicate mapping by the two agencies, resulting in significant cost savings and improved service.

In FY 1993, the Geometronics Service Center (GSC) updated 465 primary base series maps (1:24,000 scale) and 49 secondary base series maps (1:126,720 scale). GSC collected 1,624 cartographic feature files and revised an additional 1,014. GSC completed 724 digital elevation models and generated 1,301 orthophotos for forest planning and resource management use.

## Remote Sensing

Resource aerial photography contracts completed in FY 1993 covered 63,000 square miles. The program goal is to photograph all national forests every 5 years.

Use of the global positioning system (GPS) has increased significantly, with over 800 GPS receivers in use in FY 1993 (an increase of 300 over FY 1992). The Forest Service administers 25 community base stations (an increase of 5 over FY 1992).

Remotely sensed data (satellite, aerial photography, airborne video, scanner and radar) from a variety of sources have been integrated into Forest Service operations. The Nationwide Forestry Applications Program (NFAP) is responsible for technical assistance and special project support to national forest operations, the integration of remotely sensed data into GIS, and training.

## Payments to States

With few exceptions, 25 percent of all monies received from the National Forest System during any given fiscal year is paid to States in which the national forests and grasslands are located. In FY 1993, the total payment to States was \$305.8 million (table 38).



## Assistance to State, Private, and Other Federal Landowners

The agency, through the State and Private Forestry (S&PF) programs, provides assistance in managing, protecting, and using the forest resources on State, urban, and private lands to meet domestic and international demands for goods and services.

This is achieved in cooperation with State foresters; other State and Federal agencies; officials in cities, counties, and towns; tribal governments; nonprofit organizations; and academic institutions. State and Private Forestry programs are guided by the Cooperative Forestry Assistance Act of 1978 (as amended by the 1990 Farm Bill); the 1990 Resources Planning Act; and the Food, Agriculture, Conservation, and Trade Act of 1990 (Farm Bill). The goal of S&PF is to "be the Federal leader in providing assistance to clients in the sensible stewardship of forest resources in America." To accomplish its goal, S&PF adheres to seven specific program directions: (1) forest health management, (2) cooperative fire protection, (3) urban and community forestry, (4) economic action programs, (5) forest stewardship, (6) planning assistance and intergovernmental operations, and (7) natural resource conservation education.



Table 39 compares State and Private Forestry FY 1993 appropriations with long-term projected costs from the 1990 RPA Program. Table 40 displays FY 1989 through FY 1993 appropriations. Table 41 compares FY 1993 accomplishments with long-term accomplishment projections from the 1990 RPA Program.

## Forest Health Management

Forest pest management professionals provide advice and assistance to Federal, State, and private resource managers for long-range strategic planning as well as individual project plans. The objective of this program is to maintain and improve the health of the Nation's forests in an environmentally, ecologically, economically, and socially acceptable manner. The program serves the States, national forests, and agencies of the Departments of the Interior and Defense.

Nationwide total program expenditures were \$64 million, \$47 million in Federal funds and \$17 million in State and other funds. Federal funds supported all program and suppression activities on Federal lands plus 44 percent of the program activities and 52 percent of suppression activities on State and private lands. State, county, private, and other funds supported the balance of the cooperative program and suppression activities.

Accomplishment highlights include:

- Completed detection and evaluation surveys on 561 million acres of Federal and cooperative lands, and provided findings and recommendations to the managers of the affected lands.
- Published "Healthy Forests for America's Future—A Strategic Plan," which sets forth 12 strategic goals with recommended actions. Implementation was well underway.
- Provided both training and insect and disease information for participants in the Forest Health Monitoring Program, a nationwide system for gathering and analyzing information and trends on forest health conditions for formulation of public policy. Fourteen States participated in FY 1993. The program is a cooperative venture of the Forest Service, EPA, and the State foresters.
- Completed a pest risk assessment for proposed log importations from Chile. The assessment described exotic pests that pose a threat to North American forests.

### Prevention and Suppression

Accomplishment highlights include:

- Carried out prevention and suppression activities protecting 3.1 million acres of forested Federal and cooperative lands from gypsy moths, southern pine beetles, dwarf mistletoe, and other insects and diseases.

- Established the National Center of Forest Health Management in Morgantown, West Virginia, to develop technologies that provide for healthier forests. The focus is on biological control (parasites and predators) methods for pest management; nontarget effects of pest treatments and related actions; and biorational treatment methods (pheromones, viruses, bacteria, and fungi). The center is finishing the remaining projects from the very successful Appalachian Integrated Pest Management Gypsy Moth Demonstration Project.

### Pest Management Special Projects

Accomplishment highlights include:

- Evaluated the benefits and environmental risks of using pesticides critical to forestry through the USDA National Agricultural Pesticide Impact Assessment Program (NAPIAP). NAPIAP fills data gaps on environmental effects, human exposure, and fate of pesticides in the environment.
- Generated projects on long-term pest trends and developed methods for integrating forest health into forest planning processes.
- Continued the emphasis on generating improved pesticide application technology, evaluating improved pesticides, and supporting development of safer pesticides for future registration with the EPA.

## Cooperative Fire Protection

Fire is a force that transcends ownership and jurisdictional boundaries and requires the cooperation of "good neighbors" to achieve wildfire protection.

### Cooperative Fire Protection/Rural Fire Defense

The Forest Service coordinated with and provided leadership to the National Association of State Foresters Fire Committee by offering technology transfer and financial assistance for fire protection projects. Through six initiatives in the State Cooperative Fire Protection Plans, technical and financial assistance was provided to all 50 States and 7 Territories (table 42).

Over the last few years, the Forest Service has helped during national emergencies and natural disasters requiring fire management expertise. Disaster assistance aided victims of hurricanes, earthquakes, and floods.

Key accomplishments included:

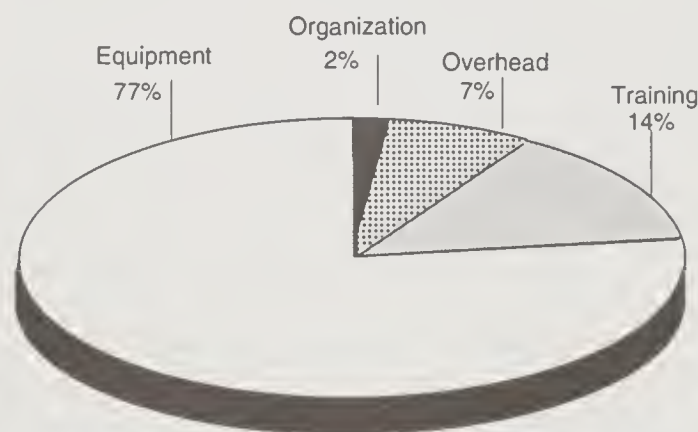
- Provided mobilization and technical assistance to the Midwest flood victims. Dispatched incident management teams and individuals to assist in all aspects of flood relief.

- Provided executive management direction to the Federal Response Plan and began the agency's own Disaster Response Plan, initiating national disaster preplanning.
- Represented the Department of Agriculture on the catastrophic disaster response group coordinating Federal Emergency Management Agency (FEMA) activities.

Through the Farmers Home Administration appropriation, the Forest Service administers the rural community fire protection program. This program provides funds for planning, organizing, equipping, and training rural fire departments serving communities with populations of less than 10,000. Accomplishment highlights include receiving approval from State foresters regarding nearly 4,000 applications from communities in all 50 States and 7 Territories. Figure 41 shows how cooperators used the \$3.5 million available in FY 1993.

Figure 41.

### Rural Community Fire Protection—Forest Service Assistance to Local Organizations—FY 1993



Farmers Home Administration Appropriation - Total: \$3.5 Million

### Federal Excess Property

The Federal Excess Personal Property Program (FEPP) helps State and local fire organizations acquire excess Federal resources for fire protection purposes.

Accomplishment highlights include:

- Provided national leadership to the FEPP, acquiring and loaning \$80 million worth of excess property to States.
- Managed 235 fixed and rotary wing aircraft, 24,000 vehicles, and many pumps, generators, and compressors currently on loan to the States.



## Wildfire Prevention

Fire prevention addresses the damage caused by unwanted, careless fires in the ecosystem. The primary goal in FY 1993 was to reduce or eliminate the number of undesirable, human-caused ignitions to minimize resource loss.

## Wildland/Urban Interface

The wildland/urban interface is a wildfire concern which continues to challenge fire management officials across the Nation. Major interface fires have occurred all over the United States. These fires are often relatively small in acreage but devastating because of the effect on personal and community life.

The Forest Service addresses the interface issue through the Wildland/Urban Interface Fire Protection Program, which targets fire-wise landscaping methods.

## Urban and Community Forestry

The Forest Service provides leadership in the management of natural resources in the urban and suburban environment to improve the quality of life for communities and teach sound conservation principles.

Accomplishment highlights include:

- Provided technical and capacity-building financial assistance for urban forestry programs through State forestry agencies to over 6,753 communities. A total of \$8.8 million was awarded in 1,832 matching grants to communities for tree planting, maintenance, and protection projects nationwide. Citizen action or volunteer organizations received 791 grants that resulted in public/private partnership efforts leading to the planting of 4.7 million trees; the private sector donated \$14.5 million to these projects.
- Completed, as a member of the National Urban and Community Forestry Advisory Council, a national strategic plan titled "The Forest Where We Live." The council also developed criteria for the challenge cost-share program, solicited related proposals, and recommended funding eight proposals for a combined total of \$1 million.
- Outreached to nontraditional audiences through a workshop at the National Conference of Black Mayors.
- Directed the U.S. Landscape Tree Planting Survey of 850 nursery companies for the second consecutive year, assisting in developing industry trendlines to guide future community tree planting efforts.
- Planted, in coordination with the National Arboretum and the National Association of State Foresters (NASF), the final trees in the National Grove of State Trees at the National Arboretum.
- Held the Sixth National Urban Forestry Conference in partnership with American Forests. The first State urban forestry coordinators' meeting was held in conjunction with this conference.
- Introduced the Treeture Program to over 500 schools, exposing teachers and students to environmental awareness and the need for planting and protecting trees. Partners included NASF, the National Tree Trust, Tree Musketeers, the International Society of Arboriculture, American Forests, and Trail of Trees.
- Published an update of "A Technical Guide to Urban and Community Forestry" and "An Introductory Guide to Establishing Urban Forestry Programs." The "Benefits of Urban Trees" brochure was translated into Spanish. The agency supported the "Urban Forests" magazine.
- Supported the first "by kids" National Youth Environmental Summit. Over 600 youth delegates developed action plans for "Trees Across America" projects and a set of resolutions.

## Economic Action Programs

Forest-related natural resources produce a wide range of economic recovery and development opportunities that can generate jobs and income for urban and rural communities. Important actions include planning and direct assistance to communities; the development of business plans, marketing strategies, and training programs; and sharing of information. These programs emphasize working through partnerships and finding long-term sustainable solutions. They are needs-driven, based on community efforts involving all facets of the community.

## Rural Community Assistance

Rural Community Assistance (RCA) helps communities diversify and expand their local economies through the use of natural resources.

National accomplishment highlights include:

- Explicitly included RCA in the agency's mission statement "Helping States and communities to wisely use the forests to promote rural economic development and a quality rural environment."



*Five-County Team works together to diversify local economies in Tennessee beyond textile industry using wood and timber products. Photo: Region 8-Coop. Forestry*

business and industry, and concerned community members.

### **Economic Recovery**

The Economic Recovery Program helps communities experiencing acute problems associated with Federal land management decisions and policies by providing technical and financial assistance to communities distressed because of their economic dependency on forest resources.

The program helps communities develop broad-based, community-led teams with the Forest Service membership. These teams assess local needs and create action plans to meet their desired futures.

Accomplishment highlights include:

- Helped 225 action teams which developed over 141 action plans.
- Provided assistance to 235 community projects.

### **Rural Development**

This broad-based national program addresses the long-term health and vitality of rural areas by helping communities faced with persistent economic problems find solutions through natural resource-based opportunities. Emphasis is on linking existing State and local plans, and providing technical and financial assistance at the local level with States and other partners.

Accomplishment highlights include:

- Began over 100 cooperative projects involving partners at all levels.
- Created business opportunities in conjunction with State forestry organizations and others in the Northeast and Midwest. In Vermont, the forest products industry has formed a partnership with the local utility company to reduce electrical demand while improving the environment. Missouri is conducting several projects to reduce wood biomass entering landfills by using a wood gasifier to heat schools and commercial buildings.
- Continued focusing efforts in Iowa on pond- and cage-reared specialty fish; wood-fired, electrical generating facilities; timber bridge kits business; and establishment of hardwood pulp mill and ready-to-assemble furniture businesses.

### **Economic Diversification Studies**

The Economic Diversification Studies Program began in FY 1989. During the last 5 years, the Forest Service has

- Continued to implement "Working Together for Rural America." National strategy concentrated on coordination, information, training, and recognition activities. Specific accomplishments included developing the brochure "Working Together—Rural Communities and the Forest Service" to help communities understand the assistance available from both the agency and each other; conducting two major partnership building events; and recognizing 18 outstanding efforts through a national awards program.
- Conducted a national review of RCA programs' effectiveness in the Southern Region through direct feedback from community members and other cooperators in eight States.
- Initiated a national collaborative planning effort to focus on increased coordination between rural communities and national forests. Five national organizations representing local governments co-sponsored the event.

Nationally, the regions and area accomplished the following:

- Leveraged agency seed money to raise over \$24,500,000 from a variety of sources, providing a 3-to-1 match. Individual contributions ranged from a few hundred dollars to over \$2 million from a single source.
- Provided technical and financial assistance for over 350 projects located in more than 450 communities, in over 41 States and 114 national forests.
- Worked with over 500 partners from various Federal and State agencies, local governments,



cost-shared 72 studies involving 22 different States. The program is now national in scope. Funds are used to cost-share feasibility studies to help rural communities dependent upon a single forest resource find ways to diversify their economies.

Accomplishment highlights include:

- Conducted a program evaluation to transfer the administration of the program to the regions, North-eastern Area, and the International Institute of Tropical Forestry.
- Cost-shared 23 studies including exploring options in secondary wood processing; value-added manufacturing; high-value agriculture, recreation, and tourism; wood products marketing; value-added manufactured products; chipping operations; building stone; and recycled products.

### Old-Growth Diversification Projects

This program assists rural, timber-dependent communities in the Pacific Northwest to diversify their economies through value-added projects funded through the Washington Department of Trade and Economic Development and the Oregon Economic Development Department. Each State received almost \$1 million. Together they leveraged an additional \$11 million.

Accomplishment highlights include:

- In Washington, focused on a demonstration program and created a revolving loan fund. Through the fund, the State provided loans to 13 businesses for a variety of purposes. Overall, the State of Washington retained 549 jobs and created 128 new positions, leveraged over \$5 million, and provided over \$8 million to communities.
- In Oregon funds were used to renovate a building to be used by tenants manufacturing value-added wood products. Assistance was provided in three areas: (1) technical assistance, (2) business development, and (3) community development. Overall, the State of Oregon created 189 jobs, obtained over \$6 million in matching funds, assisted 30 projects, and provided 20 communities with direct assistance.

### Resource Conservation and Development

The Forest Service helps the USDA carry out the Resource Conservation and Development (RC&D) Program administered by the Soil Conservation Service (SCS).

Accomplishment highlights include:

- Provided forestry assistance nationally to 178 of the 250 RC&D councils, through a partnership with State foresters.
- In FY 1993, assisted 16 RC&D steering committees throughout the United States, seeking USDA authorization as new RC&D councils.



*Community development and economic diversification through special forest products helps northern California communities in transition (pictured with Trinity Alps Botanicals). Photo: Phil Nelson, "Trinity Journal".*

- Completed approximately 167 forestry projects dealing with recycling of wood fiber, special forest products, stewardship, and various rural community assistance projects.

### Forest Products Conservation and Recycling (Wood Utilization)

Technology transfer and technical assistance are provided to businesses and communities to increase conservation of forest resources while providing economic opportunities. Assistance focuses on marketing and sustainable development; improving harvesting and processing of forest products using environmentally sensitive methods; improving utilization of wood wastes and residues; extending the useful life of forest products; and improving the understanding of forest resource values.

Accomplishment highlights include:

- Helped in securing a \$200,000 grant from the Rural Development Administration to fund a hardwoods cooperative in California.
- Provided 149 assists to communities, tribes, and businesses.
- Completed 14 publications on "Income Opportunities In Special Forest Products."
- Conducted 23 workshops on special forest products.

### **Market Development and Expansion**

This component focuses on sectors of the market to strengthen local and regional economies through improved and expanded markets for wood, minerals, gas, and other natural resources. Current efforts focus on the transportation arena and the National Timber Bridge Initiative.

### **National Timber Bridge Initiative**

The National Timber Bridge Initiative has four components: (1) demonstration timber bridges, (2) research, (3) technology transfer and information management, and (4) rural revitalization.

Accomplishment highlights include:

- Continued operating a Timber Bridge Information Resource Center. Published the newsletter "Crossings," reaching 5,000 recipients and mailed approximately 12,000 brochures and related technical information on timber bridges.
- Approved 37 demonstration vehicular and pedestrian timber bridges for construction, bringing the total to 272 vehicular and pedestrian bridges approved for construction. In FY 1993, 68 demonstration bridges were built. As of September 1993, a total of 152 demonstration bridges have been completed.
- Monitored innovative bridge designs under field conditions; developed new design criteria for use of hardwoods on long-span bridges; evaluated wood guard rail and preservative systems; established research plans in cooperation with the Federal Highway Administration and Iowa State University; and continued collaborative research cooperation with eight universities on timber bridge design criteria.

## **Forest Stewardship**

Forest stewardship focuses on educating and assisting nonindustrial private landowners to better manage, protect, and use their natural resources through the Forest Stewardship Plan and direct financial assistance.

### **Forest Resource Management**

Fifty-nine percent of the Nation's commercial timberland is in small private ownerships. Working with State foresters, the forest resource management program provides technical assistance and information to small woodland owners so that they manage their lands in accordance with ecological principles, maintaining productivity and biological diversity.

### **Forest Tax Information**

The Forest Service provides tax information to private forest landowners to assist them in planning for their financial future.

Accomplishment highlights include:

- Planned three tax workshops.
- Held a national timber tax information network meeting in Washington, DC.
- Completed and published a report regarding estate planning for forest landowners.

### **Seedlings, Nurseries, and Tree Improvement**

This program provides technical and financial assistance for nursery and tree improvement. Funds are used to train personnel in state-of-the-art nursery management and tree improvement techniques. The program helps produce high-quality, genetically improved tree seed and planting stock to improve productivity of forest lands.





Accomplishment highlights include:

- An estimated 2.4 billion tree seedlings were produced and planted.
- Approximately 63 percent of these seedlings were planted on 1.5 million acres of State, local government, and nonindustrial private lands.
- Produced "Tree Planter's Notes," an applied journal on reforestation, and the annual "Tree Planting Report," the most complete compilation of tree planting data across all ownership categories.
- Took a leading role with the Organization for Economic Cooperation and Development in revising the import/export scheme which regulates the flow of forest seed in international trade.
- Developed training sessions for State nursery personnel which emphasized seedling culture of hardwood and nontraditional forest species that are becoming more popular in reforestation and restoration projects.

#### **Forest Stewardship and Stewardship Incentives Programs**

Under the Forest Stewardship Program, the Forest Service works with private landowners to develop multiple-resource management objectives such as timber production, fish and wildlife habitat enhancement, water quality improvement, and forest recreation enhancement.

In FY 1993, assistance to nonindustrial private forest (NIPF) landowners through Federal/State cooperation led to the development of multiresource management plans on 6.9 million acres. Total reforestation (planting, seeding and natural regeneration) on NIPF lands reached about 1 million acres in FY 1993. The total land under stewardship management in FY 1993 was 2,615,645 acres, almost a million acres more than in FY 1992. The cumulative total under this program since FY 1990 is 6,276,696 (table 43). It represents the NIPF lands that have been placed under sustained multiple-use management plans (Forest Stewardship Program) by the end of FY 1993. Federal/State rural tree planting was accomplished on 667,999 acres in FY 1993, about the same acreage as in FY 1992.

The Stewardship Incentives Program assists landowners in implementing the forest management objectives identified in the Forest Stewardship Plan. Eligible landowners may be reimbursed for up to 75 percent of the cost of implementing stewardship practices.

Accomplishment highlights include:

- Provided financial assistance to nonindustrial private landowners on approximately 425,000 acres.
- Accepted requests for cost-share from 25,290 landowners.
- Planted an estimated 37,288 acres of trees.

#### **Forestry Incentives**

Administered by the Agricultural Stabilization and Conservation Service (ASCS), the Forestry Incentives Program (FIP) and the forestry component of the Agricultural Conservation Program (ACP) are cost-share programs promoting forestry on NIPF lands. The Forest Service, working with State foresters, provides technical services to landowners to ensure forestry practices are installed properly under the FIP and the ACP. Together, these programs account for a significant percentage of all reforestation on NIPF lands. (See tables 44, 45 and 46.)

Accomplishment highlights include:

- Planted trees on 175,742 acres and accomplished timber stand improvement on 35,426 acres through the FIP.
- Planted trees on 130,055 acres and accomplished timber stand improvement on 36,877 acres through the ACP.

#### **Cooperative Watershed Activities**

The Forest Service cooperates with the Soil Conservation Service (SCS) in several programs authorized by the Watershed Protection and Flood Prevention Act.

Accomplishment highlights include:

- Provided expertise and information in 52 river basin studies and 98 watershed planning projects to find solutions to local problems.
- Arranged for State forestry organizations to provide technical assistance to landowners on 29 small watershed projects. Technical assistance was also provided to 3,534 landowners for the installation of land treatment measures on 38,933 acres (table 47).
- Participated in five flood prevention projects. In cooperation with State forestry organizations, technical assistance was provided to 1,452 landowners, and watershed conditions were improved on 2,196 acres of forest and rangeland (table 48).

## Forest Legacy Program

Authorized in the Forestry Title of the 1990 Farm Bill, Forest Legacy is a conservation easement program aimed at identifying, protecting, and managing environmentally important forest lands that are threatened by conversion to nonforest uses. The program provides for purchase of a conservation easement (at appraised fair market value) by the Forest Service and the development of a stewardship management plan. Integral to that objective is the safeguarding of private landowners' property rights.

Accomplishment highlights include:

- Completed the first Forest Legacy project, Cow Mountain Pond, in Granby, Vermont.
- Obtained approval of the Secretary of Agriculture for the assessment of need for Massachusetts, thus authorizing the program and allowing projects to begin.
- Assisted and reviewed assessments of need for Vermont, Rhode Island, Maine, and New Hampshire.
- Helped a total of 17 States, and Puerto Rico, enter the Forest Legacy program.
- Held a workshop in St. Louis, Missouri, to discuss assessments of need and develop ways to improve the final product.

## Planning Assistance and Intergovernmental Operations

### Lake Tahoe Erosion Control Program (Burton-Santini Act)

In partnership with the Tahoe Regional Planning Agency, the Lake Tahoe management unit administers a grants program as authorized by the Burton-Santini Act (P.L. 96-586). Grants are made to local governments for erosion control work supporting water quality improvement in the basin. Since its inception in 1984, a total of \$15 million has been awarded in Federal grants. This amount has been matched by \$30 million of State and local funding.

Accomplishment highlights include:

- Granted \$0.8 million in FY 1993 for eight new erosion control projects. These Federal funds were matched by \$0.3 million in State and local funding.

- Completed eight projects, including the Lake Christopher stream restoration and the Ridgewood Avenue road bank stabilization projects.

### Walla Walla Trail

The trail commemorates the history of Walla Walla, Washington, one of the first areas to be settled in the State of Washington.

Accomplishment highlights include:

- Completed Phases I and II of the trail. Phase I was construction of 0.85 miles of trail through Fort Walla Walla and a drip irrigation system on the Mill Creek portion. Phase II was the acquisition of downtown property with a developed bicycle trail/park using equally matched city, State, and Federal funds.

### The Northern Forest Lands Council

The Forest Service is a member of the 17-member Northern Forest Lands Council, which makes specific policy recommendations to Congress and the Governors of the involved States.

Accomplishment highlights include:

- Assisted the council in the development of an extensive public involvement process, through which individual experts and interested parties formally advise the seven issue area subcommittees of the council.
- Assisted in the continuation of the four State-based advisory committees.
- Facilitated the development of a formal set of findings and policy options which will form the basis for policy recommendation development of the council during FY 1994.

### The Chesapeake Bay Forestry Program

The Chesapeake Bay Forestry Program is an interstate, multigovernmental partnership designed to demonstrate how forest protection, restoration, and stewardship can contribute to the renovation of the Chesapeake Bay. A 5-year plan, "Forestry and the Chesapeake: An Environmental Quality Initiative," has established six objectives to improve the quality of life throughout the Bay watershed: coordination, education, technical assistance, financial assistance, demonstration projects, and targeted forestry programs.



Accomplishment highlights include:

- Provided technical advice in the development of "tributary strategies" in the States of Maryland, Pennsylvania, and Virginia.
- Published factsheets and a brochure entitled "Forestry and the Chesapeake Bay Program."
- Authored a report published by the EPA Bay Program Technical Series entitled "The Role of Forest Buffers for Nonpoint Source Management in the Chesapeake Bay Program."
- Staffed and supported the Forestry Work Group, made up of representatives from Pennsylvania, Maryland, Virginia, the District of Columbia, and other area interest groups.
- Initiated a research synthesis on riparian forests and developed an implementation guide for forest buffer design and establishment.

#### **Hurricane Andrew Emergency Supplemental Appropriation**

Accomplishment highlights include:

- Restored the Florida urban tree canopy, with emphasis on the Bill Baggs/Cape Florida State Park.
- Provided funds for the development of forestry management plans to restore damaged commercial, urban, and private timber stocks; remove and replace damaged trees; and, prevent further damage to remaining stocks from insects and other diseases. Helped the State undertake a full tree inventory and damage assessment.

### **Natural Resource Conservation Education**

The primary objective of the Natural Resource Conservation Education Program is to support a lifelong learning process that promotes the understanding of natural resources and ecosystems—their interrelationships, conservation, use, management, and values to society.

Accomplishment highlights include:

- Maintained over 15 existing partnerships and established several hundred new partnerships with Federal natural resource management agencies and private organizations.
- Leveraged \$2.5 million with other Federal, State, and local agencies, schools, and private industries to fund approximately 200 projects nationwide.
- Sponsored the Summer of Service program, a



prototype of the President's national service initiative. The program involved college and graduate students helping innercity children and teenagers learn about the environment and natural resources.

- Reached 35,000 Scouts and 15,000 adults at the 1993 Boy Scout Jamboree through the Forest Service conservation program, "Caring for Your Forest—Fun and Responsibility."
- Maintained agency involvement in the Commencement 2000 Program, which introduces minority students to conservation.
- Implemented the following projects: "Project Learning Tree," "Investigating Your Environment," "Urban Treehouse," "Wider Opportunities with the Girl Scouts of USA," "Global Resource Guide," "Children's National Forest," and "National Envirothon."

#### **The Pinchot Institute for Conservation Studies**

The Pinchot Institute for Conservation Studies is located at Grey Towers National Historic Landmark in Milford, Pennsylvania. Grey Towers was the home of Gifford Pinchot, first Chief of the Forest Service. Conservation leadership and land ethics are the primary program areas for the Pinchot Institute for Conservation Studies. In FY 1993, the Institute:

- Directed a successful Recommitment to Conservation ceremony in honor of the 30th anniversary of the Pinchot Institute for Conservation.
- Completed Phase I of the "New Perspectives Review." The final report was completed and distributed. Joint programs with Yale University were conducted on "New Perspectives and Leadership."
- Held 23 meetings and conferences on a wide range of conservation-related topics, involving approximately 800 participants.
- Organized and coordinated a 1-day workshop for teachers and administrators with the Bronx School District.

## Scientific Research

Forest Service research is designed to enhance the environmental quality of America's 1.6 billion acres of forests and associated rangelands while developing information and technology to improve resource conservation, productivity, and protection. The knowledge developed through research is also utilized to increase the overall effectiveness of forest management.

Using the direction of the 1990 RPA Program and the recently adopted "Strategy for the 90's" for Forest Service research, the agency had more than 2,500 research accomplishments including books, papers, reports, audiovisual materials and other documents (table 49). The research program is conducted at the Forest Products Laboratory in Madison, Wisconsin; eight Regional Experiment Stations, each having several field facilities; and, the International Institute of Tropical Forestry in Puerto Rico.

In FY 1993, appropriations for Forest Service research totaled approximately \$193.1 million, of which \$27 million supported cooperative studies with colleges, universities, industry, and other domestic and international organizations (tables 50 through 52).

Forest Service research is funded under five broad budget line items: (1) forest environment, (2) forest protection, (3) resource analysis, (4) forest management, and (5) forest products and harvesting. Much of the scientific knowledge is methodically developed over time, through the foundation program. The resulting baseline information is often unique on a worldwide scale.

Forest Environment Research (FER) develops the knowledge, techniques, and strategies needed to manage, protect or enhance forest, rangeland, and associated aquatic ecosystems. Special emphases include threatened and endangered species, neotropical birds, and fisheries and watershed processes.

Forest Protection Research (FPR) provides basic knowledge about forest/atmosphere interactions needed to monitor and predict global change effects on forests and pest dynamics caused by climate, air pollutants, and other changing atmospheric factors. Fundamental knowledge of the biology of native and exotic pests is produced to help protect and maintain sustainable forest and range ecosystems. The program emphasizes broadening the knowledge base of beneficial functions and uses of fire, insects, and microorganisms needed to maintain healthy, productive forest and rangeland ecosystems.

Resource Analysis Research (RAR) provides a scientific basis for assessing the current condition and outlook for forest land resources, forest product investments and markets—including evaluation of international trade. RAR also develops methods for improving management of outdoor recreation, wilderness, and urban forest resources.

The Forest Management Research (FMR) program, through basic research, is directed toward understanding the physical, biological, and genetic factors that control the development of individual trees, forest stands, and natural ecosystems. Emphasis also is placed on science that maintains and promotes biological diversity.

Forest Products and Harvesting Research (FPHR) provides the science and technology to harvest, produce, and use wood products that are efficient, safe, and environmentally beneficial. Research has concentrated on obtaining the optimum yield from the harvested forest resource.

In addition to the foundation program of research, special emphasis is placed on selected critical national and/or international problems. For FY 1993, the special emphasis problems were global change, threatened and endangered species, wetlands, enhancing rural America, recycling, forest health monitoring, tropical forestry, and ecosystem management. Research accomplishments in FY 1993 provide scientific support for the agency's new policy to implement an ecological approach to multiple-use management.

## Scientific Support for Ecological Management

### Forest Ecosystem Management: An Ecological, Economic, and Social Assessment

The conservation of old-growth forest ecosystems, or ancient forests, in the Pacific Northwest has become controversial—pitting environmental interests against commodity interests. In an effort to resolve this issue, the President convened a national resources summit, which charged the Forest Ecosystem Management Team (FEMAT) to develop and evaluate an array of management options. The team included scientists and technical experts from a variety of disciplines in the Forest Service, the BLM, the EPA, the U.S. Fish and Wildlife Service, the National Park Service, the National Marine Fisheries Service, and several universities.

The team's work resulted in 10 scientifically based options. The option selected by the President in the Draft Environmental Impact Statement (EIS) includes provisions for 10 adaptive management areas in which





*Forest Products Laboratory scientist evaluating new technique for preventing stain and mold fungi from reproducing and growing.*  
Photo: Steve Schmieding, USDA Forest Service.

ecosystem management approaches would be applied to maintain old-growth forest attributes and viable populations of old-growth associated wildlife, such as northern spotted owls and marbled murrelets.

#### **Habitat for Pacific Salmon and Steelhead Trout**

Forest Service watershed and fisheries scientists were asked to join forest managers and representatives of other Federal agencies in addressing the decline of Pacific salmon and steelhead trout runs, half of which have been classified as being at moderate to high risk of extinction. The Forest Service provided the scientific basis for judging the consequences for fish habitat of alternative options for managing public lands in the Pacific Northwest. This interdisciplinary and interagency cooperation has continued as part of the planning for implementation of the recommendations by the President's Pacific Northwest Forest Summit to conserve habitat for these fish.

#### **Restoring the Future for Species at Risk**

As the Forest Service embraces ecosystem management, it is approaching issues in a broader landscape context. Among these are questions related to the status of species at risk and trying to ensure their future resource. Habitat Conservation Assessments (HCA's) are being prepared on a variety of species, including Pacific salmon and steelhead, small carnivores (fisher, pine marten, lynx and wolverine), marbled murrelet, bull trout, northern goshawk, forest owls (great gray, flammulated, and boreal), and inland cutthroat trout. Numerous cooperators also have been collaborating with Forest Service experts on the assessment teams.

The assessments evaluate the species' status, needs, and habitat conditions to illuminate critical considerations in the planning of management strategies. Not only does the process allow for a timely and adaptive integration of science with management, it creates a scientific foundation upon which to base Forest Service policies and practices. The HCA process is leading to greater scientific credibility and increased public support for the Forest Service.

#### **Insect, Disease, Fire and Smoke Conditions in Eastern Oregon and Washington Resulting From Ecosystem Changes**

Insect and disease infestations and fire hazards have increased dramatically in recent years in the forests of eastern Oregon and Washington as a result of ecosystem changes brought on by human use during this century. The Eastside Forest Ecosystem Health Assessment asked the question, "How have vegetation composition, landscape patterns, and hazards from natural disturbance changed over the last 50 years on National Forests?" The resulting assessment volumes include a complete review of eastside forest ecology and the impact of human use on forests and grasslands, a framework for ecosystem restoration and management, and case studies and methods of ecosystem-oriented forest management. Research methods and results are being used to develop an ecosystem approach for forest planning and management.

#### **"Pest and Pesticide Management on Southern Forests"— A Training, Reference, and User Manual**

The manual "Pest and Pesticide Management on Southern Forests" was prepared to assist the Southern States in providing certification training for forestry pesticide applicators. Approximately 4,500 copies have been distributed to requesting agencies in less than 1 year, suggesting the manual has filled a critical information void.

### **Research to Enhance Recreation, Wildlife, and Fisheries Resources**

#### **The Northern Goshawk and Total Ecosystem Management**

The northern goshawk is the largest forest hawk in North America, and an indicator of forest health. It is a Forest Service "sensitive" species because its population is declining in the Southwest. Rocky Mountain Station scientists, along with national forest and university cooperators, have developed guidelines to conserve the goshawk. By focusing on habitat needs of a broad prey base of small mammals and birds, these guidelines reflect the concept of managing an entire ecological system rather than a single species (Rocky Mountain Station General Technical Report RM-217).

### **The California Spotted Owl: A Technical Assessment of Its Current Status**

All available information was synthesized to assess the current status of the California spotted owl (General Technical Report PSW-133). Evidence does not indicate major declines in the overall abundance or distribution of California spotted owls, although they have declined in some limited areas. The reason is unknown, but the recent drought may be involved. Following the environmental assessment process, guidelines were developed for the California spotted owl and were adopted by the Pacific Southwest Region for a 2-year period, beginning March 1, 1993. During this time, the Region will prepare an Environmental Impact Statement for future management of spotted owls in Sierra Nevada National Forests.

### **Research To Save the Bull Trout**

Intermountain Forest Experiment Station fisheries biologists summarized the most important knowledge about bull trout and analyzed that knowledge using the latest principles of conservation biology and population dynamics (General Technical Report INT-302). The decline and disappearance of bull trout populations in the West have raised concerns about the survival of the species. The American Fisheries Society and others have asked the U.S. Fish and Wildlife Service to review the status of the species and consider listing it as endangered under the Endangered Species Act.

### **Red-Cockaded Woodpecker Foods**

Researchers with the Southeastern Forest Experiment Station are studying the prey that red-cockaded woodpeckers select from the potential foods available on pine bark. The woodpecker is an endangered species whose recovery depends heavily on human help. Information from these studies will provide insight into the feeding biology of the red-cockaded woodpecker that may help us better understand how to manage for the bird's survival.

### **Neotropical Migratory Birds**

With increasing habitat loss and fragmentation throughout the Americas, populations of several species of neotropical migratory birds are in decline, and some are listed under the Endangered Species Act. The Forest Service has joined with the National Fish and Wildlife Foundation, other Federal agencies, and private conservation organizations in "Partners in Flight," an international cooperative effort for neotropical migratory bird conservation. At the North Central Experiment Station, scientists and cooperators are working on landscape scale questions about neotropical bird populations and their response to environmental change, as well as to define effective conservation methods. This research has already succeeded through better understanding

of habitat relationships, population monitoring, and insight into reducing the negative impacts of parasitic brown-headed cowbirds in the Midwest.

### **Mountain Biking: An Example of the Impact of Technical Advances on the Forest**

The Pacific Southwest Forest and Range Experiment Station has examined mountain biking impacts and accompanying user conflicts. A key finding of the research was that resource managers need to get mountain bike riders involved as groups to establish trail etiquette guidelines, so as to minimize conflicts between bike riders and other recreation resource users.



*Mountain bicyclist completing questionnaire during and interview by Social Scientist Debbie Chavez. Photo: Victor Caro, USDA Forest Service.*

### **Research to Provide for Environmentally Acceptable Commodity Production**

#### **Preventing Discoloration and Rotting in Wood Products with a Biofungicide**

Scientists at the Forest Products Laboratory, Madison, Wisconsin, have developed a mutant strain of a bacteria that could successfully protect wood from discoloring. Their discovery will provide a safer, less expensive alternative to the traditional synthetic chemical treatments now used. Unlike traditional preservatives, the mutant strain does not require large energy inputs or high disposal costs. The laboratory has applied for a patent for the biofungicide which prevents or retards



stain and mold fungi from reproducing and growing. Laboratory researchers are continuing work to transfer the technology from the laboratory to industry.

### **New Paper Bleaching Technologies**

Scientists at the Forest Products Laboratory, Madison, Wisconsin, working with researchers at Emory University in Atlanta, have identified a new class of chemical compounds to provide the foundation for a new generation of environmentally friendly, economically competitive pulping and bleaching processes. The compounds, polyoxometalates, can greatly reduce capital and processing costs and cut the amount of energy needed. They make possible the development of a closed bleaching mill, greatly lessening the impact on the environment by recycling and reusing water, chemicals, and other wastes generated during processing.

### **Enzymatic De-Inking of Office Waste Paper Aids Recycling**

Most of the Nation's office waste paper ends up in the Nation's landfills instead of in recycling facilities because removing the ink often proves expensive and troublesome. Researchers at the Forest Products Laboratory have found a way to adjust conventional de-inking methods to rid paper of ink more easily, cheaply, and effectively. The process utilizes enzymes that break down cellulose. This increases processing efficiency, greatly cutting costs. Forest Product Laboratory researchers are now working with enzyme and paper chemical suppliers to develop the technology for commercial use.

### **Economic Impact of Recycling on Supply and Demand for Timber**

Researchers at the Forest Products Laboratory, in cooperation with Forestry Canada and the University of Wisconsin, have developed the North American Pulp and Paper Model. This is a computerized economic model to assess the Nation's pulp and paper markets. The computer program covers all major pulp and paper products and their manufacturing processes by region. Researchers have used the model in studies for the EPA to predict how Government recycling policies affect recycling rates and how forest resources are used.

### **Video Explains Best Management Practices to Forest Managers and the Public**

Scientists at the Fernow Experimental Forest produced a video to teach the importance of using best management practices (BMP's) and how to install BMP's. This video contains practical information covering all the various steps necessary to conduct a successful, environmentally sound timber harvesting operation. The information in the video applies to most of the Eastern United States. It can be a teaching aid for best management practices

at workshops, in forestry schools, at forestry extension classes and for providing the general public with an awareness of basic concepts.

### **Ecosystem Management of Special Forest Products Forest Fungi**

The commercial harvest of forest fungi has become a multimillion-dollar industry. This has raised concerns about destruction of forest habitat, conflict between recreational and commercial harvesters, and regulation and monitoring of future harvests. The Pacific Northwest Forest Experiment Station has sponsored and participated in several regional workshops to inform resource managers and the public of the unique ecology and management opportunities of forest mushrooms. This technology transfer culminated in a recent publication titled "Biology, Ecology, and Social Aspects of Wild Edible Mushrooms in the Forests of the Pacific Northwest: A Preface to Managing Commercial Harvest."

### **Short Rotation Management of Eucalyptus: Guideline for Plantations in Hawaii**

Research studies were conducted over a 14-year period to identify the cultural practices required to successfully establish and develop high-yielding eucalyptus plantations on 6- to 8-year rotations. Tree improvement practices can improve yields, which now run about 10 bone dry tons a year. This research, conducted jointly by the BioEnergy Development Corp., the Department of Energy, Hawaii State agencies, and the Forest Service, is summarized in a report. The guidelines are proving valuable to landowners in Hawaii, where thousands of acres of sugar lands are being abandoned. Eucalyptus trees can serve as a replacement crop on such lands, producing biomass for fuel and medium-density fiber board.

### **Hurricane Andrew Forest Damage Assessment**

An assessment of forest resource damage from Hurricane Andrew was initiated within days of landfall in southern Louisiana. The aerial video mission produced data that were analyzed to delineate damage zones and indicate areas of similar damage severities. A geographic information system (GIS) was used to develop the damage zones. The linkage of aerial video and existing Forest Inventory and Analysis (FIA) ground plot data through the use of GIS provided a quick means of estimating resource damage in the wake of Hurricane Andrew.

### **Research to Provide Improved Scientific Knowledge About Natural Resources**

#### **Keeping Exotic Insects at Bay**

The pine shoot beetle is a bark beetle common to Europe, Asia, and North Africa. Shoot-feeding dam-



*Dr. Robert Haack of the Central Forest Experiment Station examines a beetle infested log while studying the life cycle of the pine shoot bork beetle, which will lead to effective methods for it's control. Photo: James Curtis, Department of Forestry, Michigan State University.*

age can reduce tree growth by 40 to 60 percent. In 1992, the beetle was discovered in Christmas tree plantations, ornamental nurseries, and forest stands in Illinois, Indiana, Michigan, Ohio, New York, and Pennsylvania. To limit the spread of this exotic species, the USDA Animal and Plant Health Inspection Service (APHIS) imposed a Federal quarantine on movement of infested pine material to noninfested markets. North Central Forest Experiment Station scientists have determined that the beetle thrived in all 10 pine species tested. Current research will determine the life cycle of the pest, effective sampling and trapping methods, and the most effective methods of control.

### **Summarizing Oak Silviculture and Ecology Research**

Oaks are one of the most valuable groups of tree species east of the Rocky Mountains. A comprehensive review by the North Central Station makes extensive information available to managers. The publication "Perspectives on the Ecology and Silviculture of Oak-Dominated Forests in the Central and Eastern States" includes sections on regeneration ecology, ecological classification systems, history of clearcutting, alternatives to clearcutting, and restoring/maintaining special oak-dominated communities such as savannas and mast production areas. Another useful publication in oak silviculture is the result of a 1992 symposium taught by leading oak researchers. The results are contained in a Southeastern Forest Experiment Station publication, "Oak Regeneration: Serious Problems—Practical Recommendations." In the South, the decline of oaks continues to be a serious problem affecting bottomland/wetland acreage.

### **Firefighter Smoke Exposure Assessment**

Concern about possible hazardous exposure of firefighters engaged in suppressing wildfires and conducting prescribed fires on Federal, State, and private lands has led to a cooperative study on smoke exposure assessment. Preliminary results of breathing zone samples collected on more than 300 wildland firefighters indicate some potential for hazardous exposure to respirable particulates, carbon monoxide, formaldehyde, and acrolein. Results, conclusions, and management recommendations will be used to develop a risk management strategy for the safety of firefighters.

### **Promoting Great Plains Reforestation**

Trees seldom exert a greater influence upon the environment and well-being than in regions where they do not occur naturally, or where they are difficult to establish or maintain. For this reason, researchers with the Rocky Mountain Station in Lincoln, Nebraska, are evaluating introduced and native tree and shrub species for use in the Great Plains. They are selecting, breeding, testing, and establishing seed orchards to develop genetically improved plants that are resistant to imported pests, and better adapted for survival in the climate and soils of the Great Plains. This provides unparalleled opportunities for adapting trees to the Great Plains environment, and allowing consumers, landowners, and land managers to maintain and improve the economic, protective, and aesthetic benefits derived from trees.

### **Improved Processing Technology Leads to More Efficient Hardwood Resource Utilization**

Northeastern Forest Experiment Station scientists are conducting research to more effectively use the hardwood resource by developing secondary processing technology and adapting existing computer integrated manufacturing technology from other disciplines. Researchers are working with several of these technologies for automated manufacturing systems so they can be adapted to very small plants as well as larger ones. Several companies are currently using some of these research results to make more complete use of the raw material, improve their productivity, streamline their total operation, and improve their competitiveness in global markets.

### **Long-Term Research on Water Yield From Forests in the Northeast**

In the Northeastern United States, forested watersheds serve as sources of water for more than 1,000 municipalities ranging from small, rural towns to large urban centers such as New York and Boston. Since the 1950's, the Forest Service has conducted research on how forests affect the volume of streamflow from these watersheds. A recent summary of this research from study sites in New Hampshire, Pennsylvania, West



Virginia, and Minnesota has shown that harvesting forests in the Northeast dramatically reduces evaporation and in turn increases annual streamflow by up to 40 percent. The increases are especially advantageous for municipal watersheds, in that they occur primarily as augmentation to low summer flows, when demands for water are at a peak. The research has been used to develop guides for forest harvesting and vegetation management that will optimize water yields over complete rotations. The summary of this research is published in the November 1993 issue of the "Journal of Hydrology."

## **Research Response to Global Resource Change Issues**

### **Effects of Elevated CO<sub>2</sub> Growth of Southern Pines**

While continuing increases in the carbon dioxide (CO<sub>2</sub>) content of the atmosphere cause growing concern because of probable global warming, the direct effects of that CO<sub>2</sub> increase on plant growth may have some impact as well. Photosynthesis converts atmospheric CO<sub>2</sub> into sugars for plant growth. Scientists using growth chambers have found that doubling the CO<sub>2</sub> content of the atmosphere led to a 40-percent increase in photosynthesis of loblolly pines. To achieve this much gain, however, the trees had to have ideal soil moisture and nutrient supplies.

### **Zeroing in on Acid Rain**

Acid rain impacts helped focus worldwide concern about global atmospheric change. A national effort is underway to better understand the effects of global changes on forest ecosystems, and of forest management practices on the global environment. Scientists are studying how pollutants enter, move within, and affect wilderness environments with results providing valuable decision tools for land managers and planners. Examples include a comprehensive set of guidelines for measuring the physical, chemical, and biological condition of wilderness ecosystems.

### **Studying the Ecophysiology of Southern Pine Stand Development**

To better understand and predict global change impacts, an ecophysiology site has been established in a loblolly pine stand where above- and below-ground environmental conditions are being continuously monitored. In addition, physiological studies are documenting the crown and root responses to silvicultural treatments (thinning and fertilization trials) that have been imposed on the stand. The silvicultural practices imposed have created a varying array of environmental conditions in the stand that are affecting root and shoot formation and growth. The results will provide land managers with potential response strategies to increased global change.

## **Research With International Emphasis**

### **Prescribed Fire Emissions Influence on Global Change**

Intermountain Forest Experiment Station scientists cooperated with resource managers in Brazil, South Africa, Canada, and at home to gain a better understanding of how much emissions and particulates from prescribed fires might contribute to "greenhouse" gases believed to influence global climate change. Scientists developed instruments that can collect data from inside the extreme environments of fires. The equipment was used successfully in fuels ranging from the heavy slash of tropical rain forests to the relatively lighter rangeland fuels of the South African veld. Because of the global data base being assembled by these scientists, policymakers will be better able to make difficult decisions based on valid scientific data.

### **Assessing Fire Emissions From Tropical Savannas and Forests of Central Brazil Using a Spectrophotometer**

One of the Forest Service's major international efforts is the joint U.S.-Brazil program on cooperation in fire science and management. Because of the large numbers of fires in Brazil annually, there is tremendous international concern about their potential effect on the global balance of greenhouse gases and fire-derived particulates. Working with NASA Ames Research Center, Pacific Southwest Forest Experiment Station scientists have developed a specialized spectrophotometer which provides quantitative estimates of radiant energy release under the high temperature conditions associated with wildland fires. Because of the sensitivity of this sensor, accurate measure rates of spread and fire residence time were obtained during tests. Data from this sensor will enable the linkup of information from ground-based sampling of fire effects and characteristics with satellite imagery to develop accurate regional assessments of impacts of fire on the atmosphere. Approaches and goals of the fire assessment, along with preliminary results, have been described in "Photogrammetric Engineering and Remote Sensing."

### **Tropical Deforestation and the Global Increase of Atmospheric Nitrous Oxide**

The widespread conversion of tropical forests to cattle pastures leads to changes in soil biological, chemical, and physical properties that increase the emissions of nitrous oxide. Contrary to prior investigations that showed that conversion of forest to pasture always increases nitrous oxide emissions, studies by the International Institute of Tropical Forestry, Rio Piedras, Puerto Rico, demonstrated that land use history plays a major role in determining emissions. These studies took place over 3 years at 13 different sites in the Atlantic lowlands of Costa Rica. In the future, this knowledge will allow for the prediction of emission levels, given information on current land use and land use history.

### **U.S.-Brazil Symposium on Management and Rehabilitation of Degraded Lands in Amazonia**

In cooperation with the Centro de Pesquisa Agroflorestal da Amazonia Oriental (EMBRAPA/CPATU), Belem, the International Institute of Tropical Forestry, Rio Piedras, Puerto Rico, organized an international symposium on "Management and Rehabilitation of Degraded Lands and Secondary Forests in Amazonia." The symposium was held in Santarem, Brazil, in April 1993. Approximately 160 research scientists participated. The participants prioritized research and development topics that will require increased attention in the years ahead.

### **Inventories of Sustainable Farm Management Practices in the Amazon Piedmont of Brazil**

Scientists from the Forest Service, Brazil, and U.S. universities developed and tested a methodology for quantifying social and environmental factors that influence deforestation in the Brazilian Amazon. Published results from the initial surveys indicate most deforestation occurs in areas of secondary, not primary, vegetation. Further, deforestation at the farm level is strongly correlated with socioeconomic factors rather than any inherent decline in farm fertility.

### **Detecting Ozone and Demonstrating Its Phytotoxicity in Forested Areas of Poland**

Ambient concentrations of ozone were measured and ozone phytotoxicity to tobacco (*Nicotiana tabacum* L.) was demonstrated in several forest locations in Poland. At several locations in southern and central Poland, extensive ozone injury was determined on ozone-sensitive tobacco plants; such injury did not occur in eastern Poland. The results of this pilot study indicate that ozone is present at phytotoxic levels in southern and central Poland.

## **International Forestry Cooperation**

The Forest Service, through cooperative efforts with other organizations and countries, made significant progress in FY 1993 in promoting sustainable management of the world's forest resources to meet human needs while protecting a quality environment. International accomplishments added to a growing understanding of global climate change and tropical forestry and contributed to the technical and managerial expertise of developing countries responsible for fostering sustainable management of much of the world's forests. Domestic benefits to the U.S. were also an important result of the program.

### **Forest Service Participation in International Forums**

During FY 1993, the Forest Service promoted sustainable forest management policy positions in U.S. Government and international organizations.



The Forest Service represented the United States at the Global Forest Conference, "Beyond UNCED," in Indonesia where the United States encouraged implementation of forestry initiatives arising from the United Nations Conference on Environment and Development (UNCED). Discussions with Indonesian Ministers resulted in strong support for Forest Service programs in Indonesia.

Led by the Forest Service, the U.S. delegation to the United States-Japan Cooperative Program in Natural Resources (UJNR) Forestry Panel met in Tokyo, and reached an agreement for increased cooperation in delivering technical forestry assistance to developing countries. A similar agreement was reached with Taiwan. The Forest Service then represented the UJNR Forestry Panel at a meeting in Seattle to evaluate the entire UJNR technology transfer and exchange program.

The agency led the U.S. delegation at the biennial meeting of the United Nations Food and Agriculture Organization (FAO) Committee on Forestry in Rome, where it was instrumental in helping resolve a contentious North vs. South issue that had been a problem for years. Dialogue also continued with representatives of international organizations (such as FAO and World Bank) and nongovernmental organizations (such as the International Society of Tropical Foresters and World Conservation Union) on a variety of mutual interests and specific issues.

### **Other Federal Agency and Nongovernment Organizations Coordination**

The Forest Service is expanding valuable partnerships with other Federal agencies and participating in negotiating United States international natural resources policies. This expanded international role is reflected in the Department of State's approval allowing the Forest Service to negotiate a memorandum of understanding in forestry with the Russian Federation.



Support of USAID natural resources programs continued in 36 countries. A new program revision of the partnership with USAID defines broader agency participation, a reorganized working relationship, and a sharper program focus.

In 1993, the Forest Service convened the International Forestry Community of Interests of Washington, DC, several times as a forum for the coordination of U.S. international forestry activities. The RPA Program and the opportunity it represents for focusing international activities was a central interest.

### **Policy Advice and Counsel**

The agency has taken a strong role in providing a professional forestry and an international perspective to U.S. officials responsible for forest and foreign policy. In FY 1993, the Forest Service served on a White House task force established to define and shape the President's Forests for the Future Initiative (FFI).

The agency also participated in the Global Environmental Policy Review, led by the National Security Council, providing draft language for a Presidential decision directive on forests, deserts, and fresh water. The U.S. position for negotiating the International Convention on Desertification reflected Forest Service participation in the drafting of the agreement.

In FY 1993, international forestry issues of interest to the agency were identified and analyzed. Briefs and recommendations on such issues as the protection of mahoganies through the Convention on International Trade in Endangered Species; certification of tropical woods as sustainably produced; criteria for measuring sustainability in temperate countries; and impacts of privatization on Russian forest resources will clarify United States and Forest Service interests in these areas. The issue briefs are quickly establishing the Forest Service as a source of expertise on international forestry issues.

### **Forest Service Coordination**

Reassessing, reorganizing, and redirecting Forest Service international activities resulted in stronger, and more sharply focused programs in FY 1993. This emphasizes agency initiative instead of individuals reacting to opportunities.

Organizational development realignment and an expanded role for the International Institute of Tropical Forestry (IITF) was inaugurated in FY 1993. The IITF was formally established in conjunction with the Forest Service hosted International Conference on Environment and Archaeology.

Forest Service programs in the Pacific Islands were also reviewed. Alternatives were proposed for realigning and strengthening cooperative programs in research, technology transfer, outreach, and assistance to U.S. possessions and sovereign nations in the Pacific region.

The hosting of international visitors continued to be one of the best opportunities for the Forest Service to promote sustainable forest management in the developing world. In FY 1993, a total of 347 visitors from 46 countries were welcomed. Nearly 19,000 days of information, instruction, and network building were provided to foreign visitors, many of whom were ministers or other high government officials. The annual International Seminar on Forest Administration and Management, cosponsored with the University of Michigan, hosted 33 participants from 21 countries for 5 weeks.

Technical assistance, training, and cooperative research exchange to strengthen the capabilities of the developing world to practice sustainable forest management are provided through the agency. In FY 1993, approximately 207 person years of technical assistance were received by participants. (A person year is defined as participation in a given activity for 260 days within a fiscal year.) In FY 1993, 552 person years of training were received by participants.

### **The Forestry Support Program**

For the past decade, the Forest Service and the USAID have had a special relationship through USAID's Forestry Support Program (FSP). The program funds Forest Service technical backstopping for USAID forest development projects. In FY 1993, the program was extended and expanded for another decade. The following activities represent the kind of work accomplished in this program.

**Asia:** The Forest Service has identified Indonesia as a "focus country" for priority attention. In FY 1993, FSP made Forest Service skills and resources available to USAID-Jakarta for the following:

- Five training sessions for more than 50 individuals were conducted on the use of the global positioning system (GPS) for resource management purposes.
- A study tour to the Pacific Northwest for Indonesian Ministry of Forestry and forest concession staff specialists was completed. A reciprocal visit of United States engineers to Indonesia aimed at reducing the negative impacts of poor forest road design. Construction also took place.



accomplishment in FY 1993. It will contribute to the World Bank's environmental package for Russia.

The Forest Service participated in a Peace Corps' Coordinating Workshop held in Seregelyes, Hungary. Fifty-one people participated, including 20 Peace Corps volunteers and 15 host-country nationals. Environmental education work planning was initiated, networks were established for a variety of other environmental programs, and a foundation was established for Peace Corps environmental education and programming activities in Russia.

**Latin America:** A 4-day Peace Corps in-service training course on environmental assessments (EA) was presented in Chile. Approximately 30 participants benefited from the workshop at a time when NEPA-like legislation is being developed for Chile. Similar EA training was provided in Belize by the Lewis and Clark National Forest through the Sister Forest Program.

A management review of Noel Kempff Mercado National Park in the Bolivian Amazon was completed. A synthesis of management strengths and weaknesses, in accordance with international criteria utilized for such studies, was provided to USAID and Bolivian authorities.

### **The Tropical Forestry Program**

The Tropical Forestry Program (TFP) supports Forest Service work in international forestry. Since its inception in 1990, the program has grown quickly and is the mainstay for funding Forest Service international activities. The TFP emphasizes delivery of Forest Service technical skills and support to the developing world. In FY 1993, a total of \$5.8 million was approved for 106 projects. The following are characteristic of the work funded:

- The U.N. FAO's 1990 Forest Resource Assessment and Trees for Life Program;
- The Forest Service's newly created IITF in Puerto Rico;
- Expansion and strengthening of the Peace Corps' program for the environment, targeting the 31 tropical countries in which the Peace Corps operates; and
- A 3-year program of the Nitrogen Fixing Tree Association (NFTA), organizing international workshops on important multipurpose nitrogen-fixing tree species.

### **The Disaster Assistance Support Program**

Forest Service personnel assisted in the Somalia humanitarian relief effort for 7 months. Assistance was also

- Two teams of fire management specialists assisted USAID project staff and community leaders in identifying opportunities for improved fire management and conducted introductory fire management training sessions.

United States withdrawal from the Subic Bay Naval Base left the previously protected forest susceptible to illegal land conversion. USAID and the Forest Service completed a cooperative agreement with the World Wildlife Fund (WWF) to support planning, protection, and management activities at Subic Bay. Under the agreement, the Forest Service will provide technical assistance, training, and financial support for forest protection, aerial photography and mapping, management plan preparation, boundary demarcation, and ecotourism development.

**Africa:** The FY 1993 program sponsored the Resource Information Workshop and associated activities in Kenya. Participating in the workshop, coordinated by Winrock-Kenya, the Kenya Forestry Research Institute, and the Forest Service-USAID, were natural resource managers from Kenya, Uganda, and the Sudan. The goal of the workshop was to familiarize natural resource managers with methodologies and strategies for monitoring and managing bamboo-dominated ecosystems.

**Eastern Europe and Russia:** The development of a National Biological Diversity Strategy for Russia was a significant



provided to Angolan and Namibian food and water relief efforts. The program, however, also emphasizes preparedness such as providing assistance to the Austrian government for design, coordination, and mobilization phases of an international search and rescue training exercise. Staff and resources were also provided for the preparation of a field guide for disaster response. This guide was adopted by the Office of Foreign Disaster Assistance, is used by the Department of Defense, and is serving as the basis for development of United Nations disaster relief policies and procedures.



### **Cooperative Research and Scientific Exchange Activities**

Cooperative research and scientific exchange are an important part of Forest Service international activities. Cooperative research helps the developing world to find better ways to conserve and utilize their natural resources, which is also beneficial to U.S. science. A description of these activities has been included in the responses to global issues section.

In FY 1993, 69 person years of cooperative international research or scientific exchange were achieved.

### **National Forest System Activities**

In FY 1993, over one-third of the international assistance was provided by National Forest System staff. The Southeastern Region, for example, is doing work within the Caribbean Basin, the Southwestern Region with Mexico and the Pacific Southwest Region with the Pacific Basin.

### **Sister Forest Program**

FY 1993 was a year of continued expansion, with the program now including 12 national forests with personnel working in Russia, Mexico, Indonesia, Bolivia, Jamaica, Argentina, Guatemala, Costa Rica, Belize, Malia, and Panama. The Sister Forest Program is designed to use National Forest System personnel to deliver Forest Service technical expertise to the developing world, establish long-term commitment within an area, and build a global perspective within the Forest Service.

Current priorities are building partnerships with community-based and private organizations to address specific management problems and to promote conservation shared habitats for neotropical bird habitat.

The Institute of Pacific Islands Forestry (IPIF), Pacific Southwest Station, provided total quality training to forestry workers in Fiji, Tonga, Western Samoa, the Federated States of Micronesia and Vanuatu. Additional work included mangrove forestry, ecotourism, and a forestry plan for the Republic of Palau.

Region 10 is building cooperative working relationships with forest managers in the Siberian region of Russia and supporting Ducks Unlimited de Mexico's RESERVA training program. The RESERVA program will train Latin America's reserve managers in the conservation of biological diversity through better management of reserves.

### **State and Private Forestry Activities**

State and Private Forestry is carrying its expertise to an international community eager to see what the United States is doing in cooperative firefighting, pest management, and nursery management.

State and Private Forestry's fire management training follows the "focus country" approach, focusing on Brazil, Russia, Mexico, Indonesia, and southern Africa. Nearly 20 cumulative years of fire management planning, community education and detection, and communication system development training were completed. Firefighting teams were invited to the United States for "hands-on-experience," courses were developed, and technology shared. An example is the fire plan for the Burundi Chimpanzee Rehabilitation Project which will protect the new rehabilitation area from fires, and will establish cooperative programs with neighboring land-owners.

State and Private Forestry's pest management efforts contribute to the protection of forest health around the world and the health of American forests by preventing the importation of exotic pests. In FY 1993, important work was completed in Siberia on the Asian gypsy moth involved the transfer of American-designed detection equipment and techniques along with training on its use. Similar work was done in Chile to assess the risk of importing pests with shipments of logs into the United States.

"Tree Planters Notes," a magazine which shares the latest techniques in nursery management, is received in 42 countries. Training courses for foreign nationals are held in nursery management. A highlight of FY 1993 was work done with the Russian Academy of Science on the latest techniques in nursery management.

## Addressing the Human Dimension

The human dimension of the Forest Service mission, "Caring for the Land and Serving the People," emphasizes the agency's commitment to attain a multicultural and diverse work force that is responsible and accountable for excellence when serving the American people. Providing work, training, and education to the unemployed, youth, elderly, and disadvantaged are major priorities during program planning and implementation. The Forest Service values a multicultural organization as essential to its success and will continue pursuing changes in the work force composition until it becomes representative of the public we serve.

### Human Resources

#### Multicultural Organization

The agency, committed to equal opportunity in employment and program delivery, supports policies that create and support a multicultural and diverse work force, where employees of differing race, color, age, sex, national origin, religion, familial status, political affiliation, and disabilities contribute effectively at all levels of the organization.



Accomplishment highlights include:

- **Los Angeles Urban Greening Initiative:** In 1993, the Forest Service supported the Los Angeles community through the Los Angeles Urban Greening Initiative (L.A. Harvest). Through grants to 32 organizations, the Forest Service helped L.A. Harvest achieve the following results: 407 people received on-the-job training, with 33 people employed in management or supervisory jobs; 1,185 people benefited from training and educational activities; 4,279 trees were planted; 10 community gardens were established; and 29 landscaping and

beautification sites were created. Organizations receiving grants included the Korean Youth Center, Pacific Asian Consortium, Las Familias del Pueblo, and the Independent Living Center of Southern California.

- **Employment of Persons With Disabilities and Accessibility:**

The Forest Service has increased the representation of persons with disabilities to 1.26 percent, exceeding the governmentwide average. In FY 1993, the agency required telecommunication devices for the deaf at all administration sites, and that all meeting and training sites be fully accessible. The Washington Office has established an initiative with Gallaudet University and has employed two cooperative education students.

- **USDA/1890 Land-Grant and Other Historically Black Colleges and Universities:**

The Forest Service has employed more than 200 summer interns through the USDA Summer Intern program that included the 1890 Land-Grant and Other Historically Black Colleges and Universities (HBCU). Thirteen of the 31 summer interns in the Washington Office were from 1890 land-grant colleges and other HBCU's. The Forest Service also supported 37 projects, valued at \$1.8 million, through the HBCU comprehensive program. The Alabama A&M University/Forest Service Center of Excellence proposal provides a full partnership with Alabama A&M to enhance the university's ability to successfully carry out the land-grant functions of teaching, research, and public service.

- **USDA/Hispanic Association of Colleges and Universities:**

The USDA and the Forest Service established a partnership with the Hispanic Association of Colleges and Universities (HACU). The purpose of the new partnership is to: (1) increase Hispanic student employment in the USDA, (2) provide institutional support to HACU schools, and (3) support the development of HACU. The Associate Chief of the Forest Service was appointed to serve on the Department's HACU Leadership Team. As a result of this new partnership, the Forest Service hired 32 students from HACU colleges during the 1993 summer intern program. The HACU interns were assigned to work in the Washington Office and in four regional field locations.

- **Intertribal Nations University:** The national staffing and recruitment initiative at Nations University continues to make the Forest Service "the employer of choice" at this intertribal university. More than 100 of the 800 students at Nations University are enrolled in natural resources courses. The natural resource program is the fastest growing program at



the university. The Forest Service supports this program through employment and liaison activities.

- **Support For Employee Resource Groups:** The agency has had a direct and positive effect on the establishment of employee resource groups in the Forest Service. Four employee groups have been officially recognized by the Chief and Staff. The group includes African American Strategy Program, Hispanic Partnership, Asian/Pacific Islander, and Pathfinder—an association of people with disabilities in Government. The objective of these groups is to ensure that the perspectives and values of all employees are incorporated into agency decisions.
- **Nondiscrimination in Program Delivery:** Forest Service programs reach more than 2 million people every day. To ensure that the agency is “inclusive, rather than exclusive, in all aspects of program delivery,” a national train-the-trainer session for Title VI/Section 504 and Related Programs (Nondiscrimination in Federal Financially Assisted Programs) was held in May 1993. As a result of this effort, the Forest Service will be able to effectively train managers and program officials and ensure our programs are delivered to all the publics we serve. The course design and the trainer’s manual have been adapted as a model by the Department and other Federal agencies.
- **A Work Environment Free From Discrimination and Harassment Based on Gender or Sexual Orientation:** The agency has issued a strong policy statement promoting a harassment-free work environment. This statement specifically prohibits harassment based on race, national origin, religion, age, mental or physical disability, color, gender, or any other factor such as sexual orientation, marital status, union affiliation, veteran’s status, or political affiliation that might be used to categorize or identify any employee. In addition, steps have been taken to ensure that the Forest Service leadership is prepared to address the sensitive and controversial issue of harassment based on sexual orientation. During a meeting of the Forest Service leadership, a sensitivity and awareness session on sexual orientation was presented by a nationally recognized consultant.
- **Resolving EEO Complaints:** The Forest Service established four dispute resolution offices (DRO’s) staffed by a total of 10 full-time, professional Equal Employment Opportunity (EEO) counselors/mediators and support personnel. A national EEO pre-complaints manager was hired to coordinate and support the work of the four DRO’s. Since implementing the professional counselor/mediator pro-

gram, the agency’s resolution rate for complaints in the informal stage is greater than 70 percent.

- **Employment of Women in Forestry and Civil Engineering:** Through the use of various employment strategies such as cooperative education programs, job fairs, and direct hire authority, the Forest Service has exceeded the national civilian labor force (CLF) statistics for women in forestry and civil engineering professions.
- **A Multicultural Firefighting Force:** More than \$500,000 was allocated to 20 special field efforts to hire, train, or promote deserving women and minorities in order to strengthen the mid-level fire management organization. Units were directed to expand the fire prevention advertising strategies to reach a larger minority audience. Direction was provided to develop the first co-op education program in aviation. This resulted in an African American student from the University of Delaware filling a copilot position on an infrared detection aircraft. This effort furnished 35 national detail assignments to women and minorities and persons with disabilities, identifying and developing their potential as future fire management leaders.

## Human Resource Programs

Human resource programs provide job opportunities and training for youths, the unemployed, underemployed, economically disadvantaged, people with disabilities, and the elderly, while carrying out high-priority conservation work. During FY 1993, these programs offered employment and skills training to 135,556 persons, including many women and minorities. For an investment of \$107.5 million, \$131.4 million in accomplishments were returned from all programs (table 53). The participants constructed campgrounds, trails, office buildings, warehouses, fences, and roads; planted trees; fought fires; improved timber stands; and provided clerical support.

### Job Corps

Under the Job Corps program, the Forest Service operates 18 civilian conservation centers. These centers are administered in coordination with the Department of Labor’s Education and Training Administration and are authorized through the Job Training Partnership Act. The objective of the program is to assist participants in finding productive work, in entering more advanced training, or in entering the military. During the past year, the number of educational centers increased from 13 to 15.

In the educational curriculum, the civilian conservation centers took major strides in implementing their com-



puter-managed instruction system. The system automatically records student progress and student test scores, freeing teachers to devote more time to instruction, and creating a more complete automated student record system.

A new student pay and allowance system was implemented to give centers more control over student pay and allows for the inclusion of incentive bonuses to reward positive student accomplishments; for example, earning a general education development (GED) certificate or completing vocational training.

Each center now has a certified alcohol and drug abuse counselor to enhance the center's counseling program.

Through a linkage with the Glen Mills School of Pennsylvania, centers have implemented a normative culture system to further strengthen a positive atmosphere and add more structure to all center programs. The Boxelder Civilian Conservation Center on the Black Hills National Forest has developed a model linkage with the Veterans Administration through which the nearby Veterans Administration Hospital will offer training to Boxelder students, qualifying them for a nursing certificate. The hospital will also offer medical services at considerable savings.

These new projects have not diminished traditional partnerships. Agreements with the many unions that offer construction trade training at the centers remain in force. Through work in areas such as recreation, water and soil, and facilities construction, centers reported \$23 million in contributions to the support of the National Forest System. Fire suppression was another area where center crews made valuable contributions to the National Forest System.

### **Volunteers in the National Forests**

The volunteer program provides assistance in natural resource protection and management programs at

nominal cost. The program offers individuals, sponsored groups, and organizations the opportunity to donate their talents and services to help manage the Nation's natural resources. The Chief's Volunteer National Awards Program annually recognizes volunteers and employees nationally for their contributions.

The number of volunteers continues to grow. During FY 1993, 101,737 volunteers assisted in the management of the National Forest System. They included 133 international volunteers and 1,938 Touch America Project participants. They contributed 2,369 person years of work valued at \$37.7 million. Volunteers participated in resource protection and management, cooperative/international forestry, and research. Typical positions included campground hosts, information specialists, fire lookouts, and recreation, wildlife, and fisheries assistants.

The Touch America Project, a component of the volunteer program, provides greater opportunities for youths, ages 14-17, to gain work experience and environmental awareness while working on public lands.

### **Youth Conservation Corps**

The Youth Conservation Corps provides 8 weeks of summer employment for randomly selected 15- through 18-year-old youths from all strata of society. Youths earn and learn while performing conservation work such as trail improvement and maintenance, sign painting, campground maintenance, slash treatment, and livestock corral construction on the National Forest System. The enrollees are paid from Forest Service funds. In FY 1993, the 1,003 enrollees performed work valued at \$1.43 for every dollar spent.

### **Hosted Programs**

Hosted programs provide conservation training and work opportunities on the national forests or in conjunction with Federal programs. These programs provide a potential pool of multiculturally diverse employees who are gaining experience in Forest Service programs. Programs are administered through agreements with State and county agencies, colleges, universities, American Indian tribes, and private and nonprofit organizations with multiple objectives, such as disabled rehabilitation and advocacy for the elderly, or at-risk youth. Most workers represent little or no direct cost to the Forest Service since funds are supplied by State health and welfare agencies, the Job Training Partnership Act, State block grants, vocational rehabilitation offices, college work study, and other means.

In FY 1993, the 18,536 participants contributed work to national forest programs valued at \$24.9 million.



The Department of Justice, Federal Bureau of Prisons, and the Forest Service have a cooperative agreement that allows minimum security inmates to work on the National Forest System. In FY 1993, two new campsites were added. Minimum security sites have now been established on 10 national forests, involving a total of 248 inmates.

### Senior Community Service Employment Program

For over 21 years, the Senior Community Service Employment Program (SCSEP) has provided part-time employment and training opportunities for over 65,000 enrollees age 55 and older. This program supplements the permanent Forest Service work force. Enrollees work in a variety of jobs such as receptionists, computer aides, electricians, office clerks, teachers' aides, carpenters, recreational assistants, and vehicle maintenance workers.

Enrollees upgrade their work skills through a variety of training programs, providing them an opportunity for transition to the regular competitive labor market.

In FY 1993, 17 percent of the SCSEP-funded positions were placed in unsubsidized employment, compared to 16 percent in FY 1992. Workers accomplished \$42.4 million worth of conservation work, or a \$1.62 return per dollar of Federal cost.

### Youth Forest Camps

Through a partnership with the National Forest Foundation, the Forest Service operated three pilot youth forest camps (YFC) under the Youth Conservation Corps authority (P.L. 93-408) during the summer and fall of 1993. The camps were located in the States of Virginia, Oregon, and Washington. The objectives of the youth forest camps were to: (1) serve youth from all social and economic backgrounds; (2) provide a meaningful work experience; (3) accomplish unfunded, needed conservation work on forest land; (4) provide an educational component to teach strong life skills and environmental-ecosystem management concepts; (5) provide an environment for young people to grow and change, and (6) develop tools to transfer back into the work force or back into school.

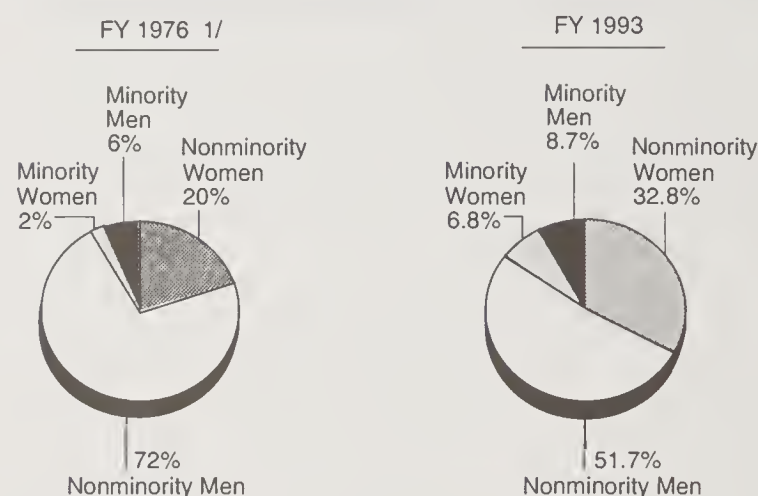
The three camps served a total of 211 youths, ages 15-18, of which 32 percent were women and 49 percent were minorities. Each enrollee gained social skills and learned to live and work with others. Many received high school credit for the summer's project. They accomplished resource projects on National Forest System lands, primarily on recreation and timber-related projects with an appraised value of approximately \$334,000.

### Agency Work Force

The agency's permanent work force declined by 837 over the past year to 34,588. See figure 42 and table 54 for work force composition by race/national origin and gender. Most of the employment reductions were in the National Forest System. Table 55 displays the number of paid employees by occupational category for selected fiscal years and table 56 displays the number of paid employees by type of appointment for selected fiscal years.

Figure 42.

### Change in Forest Service Work Force Composition



1/ Data source: 1976 Gain/Loss Report.

### USDA Demonstration Project

The USDA Demonstration Project is testing new ways to recruit and select employees from outside the agency. FY 1993 was the third year of the 5-year experiment. The agency recruits, rates, ranks, and selects employees without involving the Office of Personnel Management. Over the past 3 years, the Forest Service has hired approximately 2,000 employees under this authority. During FY 1993, the Department began efforts to make this authority permanent and to allow its use by other agencies. The success of the demonstration project was noted in Vice President Gore's National Performance Report.

### Administrative Organization

Administrative Responsibilities by Deputy Area:

#### National Forest System

Consisting of the national forests and grasslands, as well as other property managed by the Forest Service, National Forest System lands provide many varied attributes such as recreational opportunities, wildlife and fisheries habitat, biological diversity, protected

watersheds, forest and mineral commodities, and rangeland. These lands are managed by implementing the principles of ecosystem management according to the Multiple-Use Sustained-Yield Act of 1960, the RPA of 1974, as amended, and by the NFMA of 1976, which place emphasis on the value of all resources and the need to manage these in the interest of the public.

The following activities are administered by the National Forest System Deputy Area: land management planning; land ownership; wildlife and fisheries; recreation, heritage, and wilderness management; forest management; range management; timber management, watershed and air management; minerals and geology management; and engineering.

### State and Private Forestry

This Deputy Area provides technical and financial assistance to protect, manage, and use the forest resources on State, private, and urban lands in meeting the domestic and international demand for forest goods and services. The agency achieves such assistance by working with State foresters and other State officials, other Federal, State, and local agencies, Native American tribes, and private partners and landowners.

They are also responsible for the following programs within the agency: cooperative forestry, fire and aviation management, and forest pest management.

### Research

Forest Service research programs lead the way in the quest for knowledge and understanding of the dynamics of forest and rangeland ecosystems. Such programs improve the agency's ability to fulfill its multiple-use objectives and to provide technical assistance to other public and private land managers. Benefits from research extend beyond National Forest System boundaries to many segments of American society and the rest of the world.

The programs under the Research Deputy Area are forest environmental research; forest fire and atmospheric sciences research; forest insect and disease research; forest inventory, economics, and recreation research; forest management research; and forest products and harvesting research.

### International Forestry

Through cooperative efforts with other countries, agencies, and organizations, the Forest Service promotes the sound management and conservation of the world's natural resources. It fulfills its responsibility as an experienced natural resource management agency by sharing its 100 years of technical and managerial experience to meet human needs while enhancing the

environment. The programs include international forestry operations and international forestry policy and planning.

### Administration

The Forest Service administration program's main objective is to support and facilitate an efficient operation at all levels of the organization.

The following functions are under administration's responsibility: information systems and technology, excellence in financial management, fiscal and accounting services, procurement and property, multicultural organization, human resources programs, and personnel management. Until the end of FY 1993, the law enforcement and investigation program was part of this deputy area; effective in FY 1994, the program will be under the direct supervision of the Chief's office.

## Administrative Resources

### Information Management With a View to the Future

A major thrust within the Forest Service is to change the way the agency manages information. The Forest Service is using an ecosystem approach, which requires huge amounts of data and sophisticated technology platforms. Recognizing that a new philosophy in information management is needed, an information management framework (IMF) was approved in FY 1992. The strategies outlined in the IMF have been adopted as a new way of doing business, and implementation has begun. FY 1993 accomplishments include:



- Appointed a chief information officer (CIO) in February 1993 to oversee the achievement of the envisioned information management environment. An interdisciplinary information management ad-



visory group (IMAG) was appointed as an advisory body to the CIO.

- Placed emphasis on institutionalizing information resources management (IRM). The Forest Service now involves interdisciplinary teams in decisionmaking for information management to ensure that information engineering methodology serves the business of the agency.
- Chartered a team to develop an enterprisewide business model for identifying and defining key business functions and processes for the agency. The model will provide a "road map" to migrate from stand-alone business applications to an "integrated/shared information management environment."
- Created major information focus areas centered around critical needs such as financial management systems, personnel systems, and infrastructure systems.

For example, the money focus project defines and outlines a strategy for an integrated financial management and budgeting system to provide for "one-stop-shopping," through integration and sharing of the agency's financial information.

Worked towards completion of the new technology acquisition, known as Project 615, that will bring to the Forest Service an open systems environment. The open systems platform will serve as the platform for support of technical applications such as GIS and image processing. The Forest Service contracted with GSA's Federal Computer Acquisition Center (FEDCAC) to manage the Project 615 procurement and award. A pilot-year plan was approved for this acquisition to ensure the technology meets the agency's technical requirements.

- Completed a Forest Service 10-Year Telecommunications Strategic Plan. The agency also completed installation of its voice and data communications networks and installed six video teleconferencing rooms. The ongoing radio procurement program continues to provide access to state-of-the-art telecommunications facilities at a substantial cost savings. The Forest Service administered more than 14,100 radio frequency assignments for the Department of Agriculture and administered a national radio contract at a direct cost savings of nearly \$700,000 per year.

- Developed and distributed a Forest Service Application Environment (FSAE). FSAE provides software and standards in the areas of human interface, application security, and development libraries.
- A proposed rule to govern group uses of Federal lands, such as gatherings by the Rainbow Family, was published in the Federal Register on May 6, 1993. The proposed group use regulations responded to adverse court rulings that found existing group use regulations unconstitutional and unenforceable. The new rules will provide the basis and process for lawfully managing the use of Federal lands by large groups.
- Provided leadership and support to the agency's Freedom of Information Act (FOIA) and Privacy Act (PA) program. A plan to revise the processing of FOIA requests has been developed.
- Managed the agencywide directives system, reviewing 452 documents and issuing 252 directives. Reviewed 169 Federal Register issuances. Published 19 notices and three rules. Key rulemaking and policy initiatives begun in FY 1993 included permits for group uses on National Forest System lands; revision of land and resource management planning rules; revision of administrative appeals; and in cooperation with the BLM, rangeland management and grazing fee reform. Other cooperative rulemakings with USDI were implementation of the Federal Cave Resources Protection Act and the Federal Land Exchange Facilitation Act.
- Improved the controlled correspondence management application user interface by simplifying functions, improving performance time, and making the application available to a much wider audience in the Washington Office. A telecommunications electronic interface to the USDA's correspondence unit has improved the exchange of correspondence information.
- Provided the lead for the Federal Geographic Data Committee (FGDC), Vegetation Subcommittee, and served on other FGDC subcommittees and working groups. Represented USDA on the steering committee of this organization.
- In cooperation with the United States Geological Survey (USGS), identified a process whereby information gathered by each agency for digitizing the Nation's primary base series will contribute toward the national digital cartographic database.

- Cochaired the USDA Geographic Information System Working Group which is developing digital database standards and promotion of data sharing with cooperators.
- Hosted representatives from Brazil, New Zealand, and Russia to facilitate international exchange of information and the transfer of technology.

### Receipts and Expenditures

Although the Forest Service receives funds from Congress and other sources, it also produces revenue. In FY 1993, total receipts were \$1.33 billion, and total expenditures were \$3.55 billion (figure 43, tables 57 through 60). Receipts were collected primarily from timber sales, mineral leases and permits, grazing fees, and recreation uses. Figure 44 shows the distribution of receipts by program area. Tables 61 and 62 display statements of obligations and values.

Figure 43.  
Forest Service Expenditures and Receipts

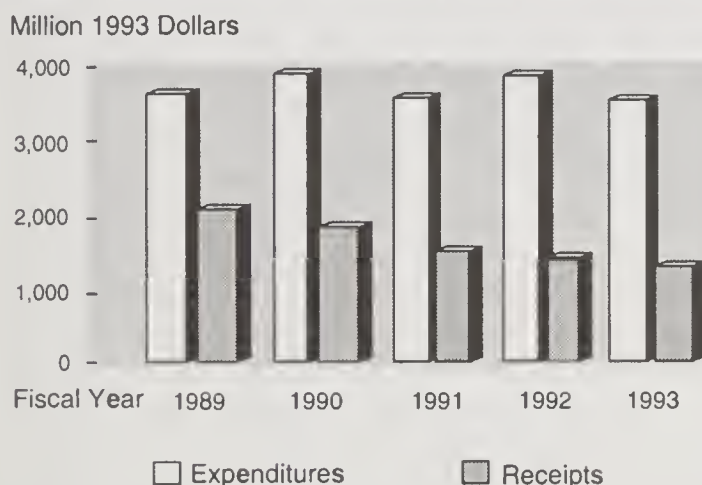
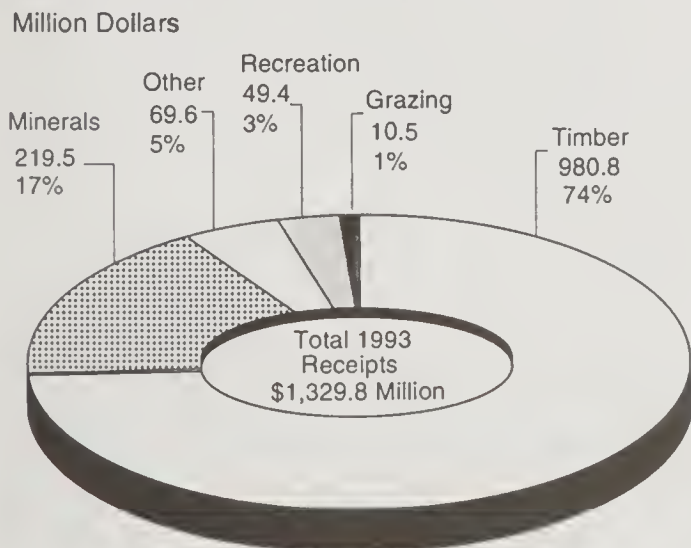


Figure 44.  
Forest Service Receipts by Program—FY 1993



### Purchase and Procurement

Approximately \$567 million was spent on more than 7,460 new contracts and 592,000 small purchase procurements. Eighty-three percent of the total procurement funds were made to small businesses. Contract awards included more than \$49 million to disadvantaged businesses and \$23 million to women-owned firms. The agency continued its outreach program through exhibits at national and local minority conferences. The percentage of total payments incurring interest penalties was reduced from 2.1 percent in FY 1992 to 1.7 percent in FY 1993. The Prompt Payment Act of 1982, as amended, requires agencies to pay interest penalties to vendors whenever payments are not made within the agreed to time periods.

The Third Party Draft was successfully piloted as a procurement tool and was well received by the vendor community. A USDA-wide contract was awarded based on the Forest Service's successful pilot effort. The use of the small purchase credit card continues to grow, with 2,645 cards now in use agencywide. Approximately 100,000 transactions resulted in over \$18 million worth of goods and services being successfully procured.

"Partnership" standards were developed, providing both procedures and provisions for international forestry support activities. Permanent appropriation language for the challenge cost-share program was obtained, and a detailed challenge cost-share legislative proposal which would provide statutory authority and clarify procedures has been submitted for congressional consideration.

Forest Service personnel managed approximately 26 million square feet of administrative use space with an annual rental of \$53 million, including buildings owned and leased by the agency and space controlled by the General Services Administration. Personal property, worth more than \$2.3 billion (about 65 percent of USDA personal property), was managed, including property on loan to State forestry departments. Approximately 4,000 units, with a value of \$40 million, were managed as living quarters for Forest Service employees.

The agency continued to encourage the recycling of all materials to conserve resources and reduce the use of landfill space. Pursuant to Executive Order 12873, the Forest Service's recycling program manager coordinated waste reduction/recycling activities and established a network of local recycling coordinators at every field office location. The Forest Service conducted an internal national recycling workshop for education and



program administration purposes. A National Information Center was established.

### **Public Affairs**

In FY 1993, the Forest Service continued its public involvement efforts with a major emphasis on improving public involvement programs throughout the agency. The Forest Service also cooperated with the BLM in involving the public on range reform. At the region/station level, public involvement efforts included analyzing more than 100,000 public responses to the spotted owl environmental impact statement, as well as involving the public in numerous forest plans, national-level environmental impact statements, and research program planning.

Public involvement training has also been a strong focus, with the Northern Region designing and implementing courses in content analysis and public involvement that build on the work of the National Public Involvement Task Force. A pilot interagency public involvement course was conducted in FY 1993 in the Washington Office. Plans are to continue cooperating with other land management agencies to provide public involvement training for employees.





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Table 1—Summary of National Forest System accomplishments compared to funded output levels and 5-year average--fiscal year 1993

Resource area	Activity	Units 1/	1993			Percent of funded	1989-93 average accomplishment	1993 as percent of 5-year average
			Funded	Accomplished 2/				
Resource Recreation Wilderness Wildlife & fish	Visitor use Management	MM RVD's	295.5	295.5		100	276	107
	Habitat improvement	MM acres	35.0	35		100	34	104
	Appropriated funds	M acres	172.5	202.9		118	201	101 3/
	K-V funds 4/	M acres	- 5/	229.3		NA	NA	NA 3/
Range	Habitat improvement	Structures	16,311.0	18192.4		112	18,682	97 3/
	Appropriated funds	Structures	-	29185.3		NA	NA	NA 3/
	Habitat inventory	M acres	11,243.6	8405.6		75	8,378	100 6/
	Appropriated funds	M acres	-	38890.1		NA	NA	NA 6/
Timber	Forage improvement	M acres	49.4	47.5		96	70	68
	Appropriated funds	M acres	-	19.8		NA	NA	NA
	Forage improvement	Structures	2,141.6	2604.1		122	2,671	97
	Appropriated funds	Structures	-	550.8		NA	NA	NA
Soil & water	Sales offering	B bd. ft.	7.0	4.6		66	8	61
	Silvicultural exams	MM acres	3.7	2.7		73	5	56
	Reforestation 7/	M acres	124.7	157.5		126	150	105
	Appropriated funds	M acres	-	292.9		NA	NA	NA
Minerals	Timber stand improvement	M acres	123.3	170.1		138	194	88
	Appropriated funds	M acres	-	165.8		NA	NA	NA
	Resource improvements	M acres	19.2	24		125	28	86
	Appropriated funds	M acres	-	10.8		NA	7	157
Minerals	K-V funds	M acres	5,694.0	5,354.70		94	8,689	62
	Soil inventory	M acres	24,092.0	25845.4		107	26,561	97
Minerals	Leases and permits	Cases						

See footnotes at end of table.

Table 1—Summary of National Forest System accomplishments compared to funded output levels and 5-year average--fiscal year 1993--  
Continued

Resource area	Activity	Units 1/	1993			1989-93 average accomplishment	1993 as percent of 5-year average
			Funded	Accomplished 2/	Percent of funded		
Support	Trail construction/reconstruction	Miles	1,977.8	1976	100	1,847	107
	Road construction						
	Appropriated funds						
	Construction 8/	Miles	63.0	44.4	70	110	40
	Reconstruction 8/	Miles	352.0	370.6	105	670	55
	Purchaser credit						
	Construction 9/	Miles	909.0	771.9	85	1,297	60
	Reconstruction 9/	Miles	2,114.0	2,254.7	107	2,879	78
	Fuel management						
	Appropriated funds	M acres	357.0	382.9	107	318	120
	Brush disposal funds	M acres	252.5	256.6	102	340	76
	Land acquired						
	Purchase and donation	M acres	69.8	115.7	166	107	108
	Exchanges	M acres	68.0	81.9	120	111	74
	Landline location	Miles	3,298.0	3286.78	100	4,117	80

1/ M = thousand, MM = million, B = billion, RVD = recreation visitor day.

2/ Does not include accomplishments from contributed funding sources.

3/ Average from 1989 to 1992.

4/ K-V = Knutson Vandenbergh Act.

5/ NA = not applicable; not available.

6/ Average from 1990 to 1992.

7/ Includes 98,369 acres of certified natural regeneration without site preparation.

8/ Includes Tongass Timber Supply funds: 0.3 miles of construction.

9/ Includes miles turned back to the Forest Service for construction or reconstruction (purchaser election program).



	1993 Actual	1995 RPA 1/ 1,000 constant 1993 dollars	Percent of 1993 Actual to 1995 RPA
Minerals area management	34,812	48,532	72
Real estate management	(36,024)	NA 2/	NA
Landline location	(30,873)	NA	NA
Real estate management and landline location	66,897	100,373	67
Maintenance of facilities	26,495	31,987	83
Cooperative law enforcement	15,479	48,532 3/	32
Forest road maintenance	81,936 4/	132,360	61
Recreation use	(229,742)	NA	NA
Forest trail maintenance	(31,332)	NA	NA
Recreation use and trail maintenance	261,074	254,793	102
Sales administration and management	219,033	295,604	74
Reforestation and stand improvement	92,306 5/	78,313	118
Wildlife and fish habitat management	116,364	167,656	69
Range management	(44,443)	NA	NA
Range betterment fund	(4,647)	NA	NA
Range management and range betterment fund	49,090	66,180	74
Soil, water and air management	72,325	80,519	90
Subtotal	1,035,811	1,304,849	79
General Administration (subtotal)	305,941	365,093	84
Forest fire protection	189,163	217,291	87
Fighting forest fires	185,411	144,493	128
Subtotal	374,574	361,784	104
Youth Conservation Corps (subtotal)	(1,000)	NA	NA
Construction:			
Construction of facilities 5/	83,868	NA	NA
Forest road construction	140,586	NA	NA
Forest trail construction	27,233	NA	NA
Forest roads purchaser construction 6/	(110,669)	NA	NA
Transfer to salvage	-2,750	NA	NA
Subtotal	248,937	NA	NA

See footnotes at end of table.

Table 2—National Forest System funding--fiscal year 1993 compared to long-term program costs—Continued

	1993 Actual	1995 RPA 1/	Percent of 1993 Actual to 1995 RPA
Land acquisition	62,412	NA	NA
Acquisition of lands for National Forests, special acts	1,180	NA	NA
Acquisition of lands to complete land exchange	151	NA	NA
Gifts, donations and bequests	5	NA	NA
Permanent appropriations	539,240	NA	NA
Trust funds	310,191	NA	NA
Subtotal	913,179	NA	NA
Total	2,878,442	NA	NA

1/ Information from 1990 RPA Program.

2/ NA = not applicable; not available.

3/ Includes NFS, cooperative, and drug enforcement/law enforcement activities.

4/ Does not include \$1,172,590 of Washington Office and National Commitment funds.

5/ Includes reforestation trust fund dollars.

6/ Excludes construction of research facilities.

7/ This account was taken off budget in 1982. For comparison, the amounts are shown as non-add items.



Table 3--National Forest System funding--fiscal years 1989-93

	1993	1992	1991 1/	1990	1989
	<i>1,000 dollars actual</i>				
Minerals area management	34,812	34,332	30,380	28,414	28,439
Real estate management	36,024	35,430	31,192	25,973	25,503
Landline location	30,873	32,251	29,844	30,710	28,678
Maintenance of facilities	26,495	26,283	24,866	21,142	17,553
Cooperative law enforcement	15,479	8,377	15,538	11,082	10,615
Forest road maintenance	81,936	85,891	91,303	96,384	80,729
Forest trail maintenance	31,332	30,549	28,228	24,459	20,797
Sales administration and management	219,033	263,745	263,133	251,796	229,476
Reforestation and stand improvement 3/	92,306	96,521	101,960	99,995	102,597
Recreation use	229,742	216,396	198,817	153,613	142,254
Wildlife and fish habitat management	116,364	112,500	106,626	81,500	64,994
Range management	44,443	43,153	39,473	32,966	30,567
Soil, water and air management	72,325	76,243	72,153	61,612	57,429
Subtotal	1,031,164	1,061,671	1,033,513	919,646	839,631
General Administration (subtotal)	305,941	303,786	292,333	272,154	272,116
Forest fire protection	189,163	187,411	179,899	177,792	166,616
Fighting forest fires	185,411	110,589	118,035	611,850	125,000
Subtotal	374,574	298,000	297,934	789,642	291,616
Youth Conservation Corps (subtotal) 4/	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)
Construction					
Construction of facilities 5/	83868	77,497	82,578	40,593	33,914
Forest road construction	140586	168,989	173,072	164,356	175,657
Forest trail construction	27233	21,667	21,479	18,611	15,947
Forest roads purchaser construction 6/	(110,669)	(113,000)	(118,690)	(120,310)	(120,770)
Transfer to salvage	-2,750	NA 7/	NA	NA	NA
Subtotal	248,937	268,153	277,129	223,560	225,518

See footnotes at end of table.

Table 3--National Forest System funding--fiscal years 1989-93--Continued

	1993	1992	1991 1/	1990	1989
	<i>1,000 dollars actual</i>				
Land acquisition					
Acquisition of lands for National Forests, special acts	62,412	88,306	88,695	63,433	64,205
Acquisition of lands to complete land exchange	1,180	1,134	1,097	1,045	966
Early Winters land exchange	151	1,230	105	13	335
Gifts, donations and bequests	0	0	497	0	0
Range betterment	5	96	1	3	90
Permanent appropriations	4,647	4,795	4,546	4,915	3,946
Trust funds	539,240	550,562	569,144	638,040	474,117
	310,191	303,379	281,974	260,137	267,748
Total	2,878,442	2,881,112	2,846,968	3,172,588	2,440,288

1/ Post sequestration with supplemental.

2/ Does not include \$1,172,590 of Washington Office and National Commitment funds.

3/ Includes reforestation trust fund dollars.

4/ Appropriations Act required minimum level of funding from National Forest funds; amounts not included in totals.

1989 - operated a \$2.2 million program from available funds.

1990 - operated a \$2.1 million program from available funds.

1991 - operated a \$1.8 million program from available funds.

1992 - operated a \$2.5 million program from available funds.

1993 - operated a \$2.1 million program from available funds.

5/ Excludes construction of research facilities.

6/ This account was taken off budget in 1982. For comparison, the amounts are shown as non-add items.

7/ NA = not applicable; not available.



Table 4—Summary of National Forest System 1993 accomplishments compared to long-term program trends

Resource area	Activity	Units 1/	1993 Actual	1995 RPA 2/	1992 Actual	Percent of change comparisons	
						1992 Actual to 1993 Actual	1993 Actual to 1995 RPA
Final output 3/ Timber	Sales offering	B board ft	4.6	10.8	5.1	-10	135
Recreation	Visitor use 4/	MM RVD's	295.5	308.0	287.7	3	4
Range	Permitted grazing	MM AUM's	9.8	9.3	9.3	5	-5
Minerals	Applications, proposals, and administration	M cases	25.8	37.9 5/	25.5	1	47
Wildlife & fish	User-days of recreation	MM WFUD's	19.0	48.9	44.4	-57	157
		MM AO's	110.1	- 6/	105.2	5	NA
Intermediate output 7/							
Timber	Reforestation 8/	M acres	450.4	416.0	482.0	-7	-8
Wildlife & fish	Timber stand improvement	M acres	335.9	323.0	353.1	-5	-4
	Habitat improvement	M acres	432.2	-	495.7 9/	-13	NA
	Habitat inventory	Structures	47,377.7	-	38,009.0 9/	25	NA
	Habitat inventory	M acres	47,295.7	-	13,252.5 9/	257	NA
Wilderness	Management	MM acres	34.6	35.3	34.0	2	2
Soil & water	Resource improvement	M acres	24.0	46.0	36.2 9/	-34	92
	Soil inventory	M acres	5,355.0	-	6,464 9/	-17	NA
Range	Forage improvements	M acres	71.2	-	108.3 9/	-34	NA
	Forage improvements	Structures	2,604.1	-	4,157.0 9/	-37	NA
Trails	Construction/reconstruction	Miles	1,976.0	2,396.0 10/	1,975.6	0	21
Roads	Construction/reconstruction	Miles	3,441.6	7,869.0 11/	4,439.9 11/	-22	129
Fire	Fuels management	M acres	382.9	781.0	594.0 12/	-36	104
Lands	Purchase and donation	M acres	116.0	-	161.7	-28	NA

1/ B = billion, MM = million, M = thousand, RVD's = recreation visitor-days, AUM's = animal unit months, WFUD's = wildlife and fish user days, AO's = activity occasions.

2/ Information derived from 1990 RPA Program.

3/ Final output = forest and rangeland goods and services purchased or consumed by the private sector or individual consumers.

4/ WFUD's are included in RVD's.

5/ Reported as operations in the 1990 RPA Program.

6/ These items were not reported in the RPA Program.

7/ Intermediate output = work performed by the Forest Service that contributes to the production of final outputs.

8/ Includes acres from carryover funds, and does not include accomplishments from contributed funds.

9/ Acres accomplished with appropriated funds, excess timber receipt funds, and K-V funds.

10/ Does not include trail reconstruction.

11/ Includes appropriated and purchaser roads.

12/ Includes accomplishments from appropriated funds and brush disposal funds.

**Table 5—Draft and final forest plan environmental impact statements filed with the Environmental Protection Agency by region as of September 30, 1993 1/**

Northern Region	Rocky Mountain Region	Southwestern Region	Intermountain Region
<i>Final</i> Flathead (MT) Lewis & Clark (MT) Beaverhead (MT) Helena (MT) Lolo (MT) Bitterroot (MT) Custer (MT) Deerlodge (MT) Nez Perce (ID) Gallatin (MT) Idaho Panhandle (ID) Clearwater (ID) Kootenai (MT)	<i>Final</i> Rio Grande (CO) 2/ Nebraska (NE) Bighorn (WY) 3/ Arapaho-Roosevelt (CO) 2/ Grand Mesa, Uncompahgre, and Gunnison (CO) Routt (CO) 2/ San Juan (CO) Black Hills (SD) 4/ White River (CO) Pike-San Isabel (CO) Medicine Bow (WY) Shoshone (WY) 3/	<i>Final</i> Cibola (NM) Tonto (AZ) Carson (NM) Coronado (AZ) Gila (NM) Lincoln (NM) Prescott (AZ) Apache-Sitgreaves (AZ) Coconino (AZ) Santa Fe (NM) Kaibab (AZ)	<i>Final</i> Bridger-Teton (WY) Boise (ID) Uinta (UT) Wasatch-Cache (UT) Targhee (ID) 2/ Caribou (ID) Fishlake (UT) Toiyabe (NV) Dixie (UT) Humboldt (NV) Payette (ID) Challis (ID) Ashley (UT) Sawtooth (ID) Manti-LaSal (UT) Salmon (ID)
Pacific Southwest Region	Pacific Northwest Region	Southern Region	Eastern Region
<i>Draft</i> Klamath (CA) 5/ Shasta-Trinity (CA) 5/ Mendocino (CA) 5/ Six Rivers (CA) 5/	<i>Final</i> Deschutes (OR) Okanogan (WA) Wallowa-Whitman (OR) Wenatchee (WA) Olympic (WA) Siuslaw (OR) Umatilla (OR) Gifford Pinchot (WA) Mt. Hood (OR) Umpqua (OR) Malheur (OR) Rogue River (OR) Mt. Baker (WA) Winema (OR) Willamette (OR) Colville (WA) Siskiyou (OR) Fremont (OR) Ochoco (OR)	<i>Final</i> Francis Marion (SC) 2/ Sumter (SC) Mississippi (MS) Kisatchie (LA) Chattahoochee- Oconee (GA) Daniel Boone (KY) Jefferson (VA) 2/ George Washington (VA) 6/ Caribbean (PR) 2/ Cherokee (TN) Ozark-St. Francis (AR) Florida (FL) 2/ Ouachita (AR) Alabama (AL) Croatan-Uwharrie (NC) Nantahala-Pisgah (NC) Texas (TX)	<i>Final</i> Hoosier (IN) Nicolet (WI) Superior (MN) Monongahela (WV) Chippewa (MN) Allegheny (PA) Huron-Manistee (MI) Chequamegon (WI) Mark Twain (MO) Hiawatha (MI) Ottawa (MI) White Mountain (NH) Green Mountain (VT) Shawnee (IL) Wayne (OH)
<i>Final</i> Cleveland (CA) Angeles (CA) Plumas (CA) 3/ Sequoia (CA) 3/ Los Padres (CA) Inyo (CA) 3/ Eldorado (CA) 3/ San Bernardino (CA) Lake Tahoe Basin 3/ Management Unit (CA) Tahoe (CA) 3/ Modoc (CA) 3/ Stanislaus (CA) 3/ Sierra (CA) 3/ Lassen (CA) 3/			<u><b>Alaska Region</b></u>  <i>Final</i> Chugach (AK) Tongass (AK) 4/

1/ Includes forest plans filed in previous years.

2/ Plans in revision process with Notice of Intent issued.

3/ Significant Amendment Notice of Intent issued.

4/ Revised plans issued in draft.

5/ Withdrew previous draft due to spotted owl listing; issued revised drafts in FY 1993.

6/ Revised Plan issued in final.



Table 6—Lands administered by the Forest Service as of September 30, 1993

State, Commonwealth, or Territory 1/	National Forests, purchase units, research areas, and other areas	National Grasslands	Land utilization projects	Total
	Acres			
Alabama	658,755	0	40	658,795
Alaska	22,193,395	0	0	22,193,395
Arizona	11,246,668	0	0	11,246,668
Arkansas	2,528,906	0	0	2,528,906
California	20,597,538	18,425	0	20,615,963
Colorado	13,838,233	628,379	0	14,466,612
Connecticut	24	0	0	24
Florida	1,135,306	0	0	1,135,306
Georgia	860,332	0	0	860,332
Hawaii	1	0	0	1
Idaho	20,392,815	47,749	0	20,440,564
Illinois	268,452	0	0	268,452
Indiana	189,378	0	0	189,378
Kansas	0	108,175	0	108,175
Kentucky	673,322	0	0	673,322
Louisiana	601,398	0	0	601,398
Maine	52,860	0	0	52,860
Michigan	2,848,183	0	959	2,849,142
Minnesota	2,814,624	0	0	2,814,624
Mississippi	1,152,741	0	0	1,152,741
Missouri	1,465,279	0	13,104	1,478,383
Montana	16,806,126	0	0	16,806,126
Nebraska	257,491	94,435	0	351,926
Nevada	5,801,183	0	0	5,801,183
New Hampshire	721,409	0	0	721,409
New Mexico	9,185,327	136,417	240	9,321,984
New York	13,327	0	0	13,327
North Carolina	1,233,878	0	0	1,233,878
North Dakota	743	1,105,043	0	1,105,786
Ohio	211,891	0	0	211,891
Oklahoma	254,257	46,286	0	300,543
Oregon	15,542,879	111,352	856	15,655,087
Pennsylvania	513,103	0	0	513,103
Puerto Rico	27,831	0	0	27,831
South Carolina	608,725	0	0	608,725
South Dakota	1,144,793	868,181	0	2,012,974
Tennessee	627,730	0	0	627,730
Texas	637,109	117,531	0	754,640
Utah	8,098,644	0	0	8,098,644
Vermont	345,367	0	0	345,367
Virgin Islands	147	0	0	147
Virginia	1,647,670	0	0	1,647,670
Washington	9,159,338	0	738	9,160,076
West Virginia	1,025,341	0	0	1,025,341
Wisconsin	1,518,179	0	0	1,518,179
Wyoming	8,682,526	572,211	0	9,254,737
Total	187,583,224	3,854,184	15,937	191,453,345

1/ Unlisted States have no lands administered by the Forest Service.

Table 7--Miles of landline location by region--fiscal year 1993

Region	Total miles boundary	Miles Surveyed 1993	Miles Surveyed To Date	Maintained 1993
Northern	27,725	408	8,504	157
Rocky Mountain	48,850	492	7,971	103
Southwestern	17,264	182	5,427	82
Intermountain	20,960	232	4,349	27
Pacific Southwest	26,700	392	11,964	50
Pacific Northwest	25,627	365	15,795	382
Southern	41,315	636	36,595	3,479
Eastern	42,071	571	11,719	48
Alaska	2,602	50	1,474	5
Total	253,114 1/	3,328	103,798	4,333

1/ The total miles of boundary has been reduced by 19,295 as the result of a recent inventory by the regions. The reduction is the result of consolidation of ownership through the exchange and purchase programs since the last inventory in 1970. The increase in Alaska is due to the Alaska Native Claims Settlement Act of 1971 and the Alaska Statehood Act of 1958.

Table 8--Land acquisition and exchange--fiscal year 1993

	Acres	Cases	Value
			<i>Million dollars</i>
Purchase	116,000 1/	413	70.0
Exchange	82,000	113	61.0
Donations and contributions	252	15	0.2
Total	198,252	541	131.2

1/ Includes 115,838 acres purchased through L&WCF and 162 acres through Acquisitions, Special Acts.



Table 9--Wildlife and fish habitat inventory and improvement by region--fiscal year 1993 1/

Region	Wildlife	Inland fish	Anadromous fish	Threatened, endangered & sensitive species	Total 2/
Northern					
Acres of inventory	290,971	3,819	3,018	171,246	469,054
Acres of improvement	4,726	472	192	1,685	7,075
Structures	69	357	145	79.5	650
Rocky Mountain					
Acres of inventory	133,994	21,499	0	150,787	306,280
Acres of improvement	14,134	608	0	7	14,749
Structures	146	366	0	17	529
Southwestern					
Acres of inventory	363,286	3,076	0	504,229	870,591
Acres of improvement	10,604	243	0	7,573	18,420
Structures	1,143	500	0	28.5	1,672
Intermountain					
Acres of inventory	372,270	2,232	270	879,934	1,254,706
Acres of improvement	21,356	251	52	371	22,030
Structures	688	551	79	242	1,560
Pacific Southwest					
Acres of inventory	316,131	3,235	4,893	1,245,454	1,569,713
Acres of improvement	19,565	8,777	2,153	3,531	34,026
Structures	391	181	204	180	956
Pacific Northwest					
Acres of inventory	493,390	8,610	54,588	984,874	1,541,462
Acres of improvement	6,783	157	530	2,718	10,188
Structures	1,123	563	3,355	226	5,267
Southern					
Acres of inventory	267,191	9,054	0	463,636	739,881
Acres of improvement	20,972	2,351	0	41,177	64,500
Structures	806	976	0	848	2,630
Eastern					
Acres of inventory	291,924	27,504	276	212,678	532,382
Acres of improvement	19,665	4,111	394	4,818	28,987.5
Structures	2,258	1,405	239	828	4,730
Alaska					
Acres of inventory	531,639	2,663	418,643	168,590	1,121,535
Acres of improvement	190	12	2,691	0	2,893
Structures	51	29	94	25	199
Total 2/					
Acres of inventory	3,060,795	81,692	481,688	4,781,428	8,405,603 3/
Acres of improvement	117,995	16,982	6,012	61,880	202,868 4/
Structures	6,674	4,928	4,116	2,474	18,192 5/

1/ Includes activities accomplished with appropriated Protection and Maintenance Funds.

2/ May not add due to rounding.

3/ In addition, 818,544 acres were inventoried with contributed funds, 41,087 with timber sale (K-V) funds, and 12,306 with carryover funds.

4/ In addition, 53,399 acres were improved with contributed funds, 229,295 with timber sale (K-V) funds, and 2,968 with carryover funds.

5/ In addition, 2,079 structures were completed with contributed funds, 29,185 with timber sale (K-V) funds, and 161 with carryover funds.

Table 10--Total recreation use on National Forest System lands by State--fiscal years 1989-93

State, Commonwealth, or Territory 1/	1993	1992	1991	1990	1989
	<i>1,000 RVD's 2/</i>				
Alabama	832.6	700.6	676.7	698.1	685.5
Alaska	5,514.8	5,887.5	5,717.9	5,413.6	4,636.2
Arizona	30,972.6	25,543.7	21,548.8	19,038.5	18,997.5
Arkansas	2,105.7	2,153.0	2,109.0	2,440.9	2,377.0
California	69,981.2	67,614.1	65,220.8	61,006.6	63,685.3
Colorado	30,106.3	29,053.0	25,998.0	25,204.2	23,238.2
Florida	3,123.7	3,104.4	3,080.8	2,961.2	2,851.5
Georgia	3,033.0	2,993.3	2,839.1	2,833.3	2,715.1
Idaho	13,455.0	13,086.8	12,908.5	11,819.1	11,738.3
Illinois	1,028.5	899.5	843.4	1,637.7	950.1
Indiana	501.0	551.8	594.0	568.8	587.6
Kansas	82.9	75.5	66.1	61.3	48.0
Kentucky	2,106.2	2,112.5	2,111.5	2,446.5	2,327.0
Louisiana	532.9	507.1	486.4	527.3	512.7
Maine	113.6	60.7	60.7	57.7	52.8
Michigan	5,011.3	4,755.0	8,153.0	4,916.4	4,725.4
Minnesota	5,676.2	5,738.5	4,956.4	5,399.3	5,147.6
Mississippi	1,317.8	1,297.5	1,285.1	1,177.1	1,236.9
Missouri	1,931.2	1,803.4	1,742.3	1,712.6	1,704.8
Montana	11,001.4	11,046.3	10,595.3	9,703.6	9,412.5
Nebraska	260.2	200.1	147.1	148.7	142.0
Nevada	3,677.1	3,360.0	3,283.1	3,277.9	3,081.5
New Hampshire	3,242.8	3,036.9	4,013.5	2,675.6	2,683.7
New Mexico	8,775.1	8,602.6	8,065.3	7,704.2	7,465.6
New York	35.0	31.2	45.0	71.5	22.4
North Carolina	6,158.4	5,767.3	5,691.8	5,472.0	5,036.2
North Dakota	135.2	142.2	198.6	168.5	184.3
Ohio	679.5	671.7	521.6	504.4	429.5
Oklahoma	358.2	368.8	373.0	386.8	341.4
Oregon	19,285.2	19,898.0	21,036.5	21,035.7	18,231.1
Pennsylvania	2,950.3	2,942.0	2,976.5	2,631.2	2,605.1
Puerto Rico	296.1	289.3	280.1	185.6	396.0
South Carolina	944.3	950.3	942.8	816.1	974.5
South Dakota	3,351.9	3,243.7	3,095.4	2,965.5	2,737.3
Tennessee	2,956.9	2,977.5	2,923.8	2,826.0	2,655.3
Texas	2,302.9	2,273.4	2,253.1	2,154.8	2,057.1
Utah	15,157.1	18,413.2	13,336.7	12,744.1	13,312.8
Vermont	1,727.7	1,564.7	1,570.5	1,368.9	1,352.3
Virginia	4,476.5	4,268.8	4,173.4	3,900.1	3,946.3
Washington	18,735.1	18,739.9	22,458.0	22,451.1	18,017.7
West Virginia	1,353.6	1,264.1	1,339.8	1,234.4	1,146.3
Wisconsin	2,732.5	2,185.1	2,215.3	2,094.9	1,978.6
Wyoming	7,453.6	7,515.5	6,914.3	6,608.8	6,068.0
Total	295,473.1	287,690.5	278,849.0	263,050.6	252,495.0

1/ Unlisted States have no Forest Service recreation programs.

2/ One recreation visitor-day (RVD) is the recreation use of National Forest land or water that aggregates 12 visitor-hours. This may entail 1 person for 12 hours, 12 persons for 1 hour, or any equivalent combination of individual or group use, either continuous or intermittent.

Table 11—State summary of total recreation use on National Forest System lands by activity—fiscal year 1993

State, Commonwealth, or Territory 1/	Camping, picnicking & swimming	Mechanized travel & viewing scenery	Hiking, horseback riding & water travel	Winter sports	Resorts, cabins & organization camps
<i>1,000 RVD's 2/</i>					
Alabama	311.6	116.3	66.5	0.0	0.4
Alaska	357.2	3,498.3	346.1	138.0	169.3
Arizona	7,184.6	13,189.7	2,664.8	419.1	919.0
Arkansas	586.3	516.0	208.1	0.1	23.4
California	19,281.3	24,685.3	5,088.1	4,170.5	7,578.5
Colorado	6,259.5	9,397.2	2,484.2	6,671.4	702.7
Florida	1,720.3	485.1	178.0	0.0	215.4
Georgia	912.6	988.0	396.8	3.1	46.3
Idaho	3,874.5	3,723.6	1,150.2	866.5	668.2
Illinois	230.6	376.8	162.1	1.5	8.1
Indiana	204.2	66.9	65.6	0.3	1.4
Kansas	17.1	27.6	2.5	0.0	1.9
Kentucky	640.0	663.9	250.7	1.0	17.3
Louisiana	161.1	145.5	22.5	0.0	23.2
Maine	22.1	45.7	17.1	4.2	3.6
Michigan	1,583.5	1,695.0	292.7	59.2	111.3
Minnesota	1,866.8	1,033.1	866.6	102.7	460.0
Mississippi	243.0	344.3	116.6	0.0	10.5
Missouri	566.6	546.2	291.4	0.0	10.7
Montana	2,103.2	3,552.0	1,227.2	690.8	383.4
Nebraska	52.6	84.2	23.1	0.5	29.2
Nevada	1,026.4	1,193.5	401.9	356.9	144.7
New Hampshire	680.9	1,237.2	366.1	631.3	222.2
New Mexico	2,874.1	2,001.1	816.9	834.0	246.8
New York	16.2	5.6	3.6	1.7	0.0
North Carolina	1,597.6	2,162.0	970.6	14.5	98.7
North Dakota	15.4	38.6	12.9	1.1	0.0
Ohio	110.6	134.6	76.7	1.0	0.0
Oklahoma	46.2	173.5	20.9	0.0	0.1
Oregon	6,017.8	5,551.2	1,992.7	1,139.1	1,941.3
Pennsylvania	879.4	1,305.9	270.9	14.1	53.7
Puerto Rico	109.2	102.2	23.1	0.0	7.8
South Carolina	254.2	221.8	126.4	0.0	0.4
South Dakota	218.5	2,526.1	179.5	18.8	115.4
Tennessee	1,155.7	879.8	300.0	5.8	96.2
Texas	637.7	430.8	99.1	0.0	23.4
Utah	5,128.1	4,353.9	1,168.6	1,051.6	795.1
Vermont	122.1	291.4	96.2	923.4	74.3
Virginia	1,066.3	1,523.8	441.3	23.0	21.3
Washington	6,284.2	6,977.4	1,916.3	649.8	1,103.0
West Virginia	543.1	270.0	130.4	3.5	33.2
Wisconsin	589.2	918.9	161.3	46.1	25.1
Wyoming	1,767.2	2,093.0	1,136.0	385.6	699.9
Total	79,318.8	99,573.0	26,632.3	19,230.2	17,086.4

See footnotes at end of table.



Table 11—State summary of total recreation use on National Forest System lands by activity—fiscal year 1993--  
Continued

Hunting	Fishing	Non-consumptive fish & wildlife use	Other recreation activities	Total	State, Commonwealth, or Territory 1/
1,000 RVD's 2/					
159.5	66.6	5.4	106.3	832.6	Alabama
136.8	474.4	36.8	357.9	5,514.8	Alaska
942.1	859.1	461.7	4,332.5	30,972.6	Arizona
517.4	100.8	28.2	125.4	2,105.7	Arkansas
1,574.5	3,283.7	521.0	3,798.3	69,981.2	California
1,704.6	1,752.2	143.4	991.1	30,106.3	Colorado
233.0	177.6	21.0	93.3	3,123.7	Florida
375.2	177.1	37.8	96.1	3,033.0	Georgia
1,026.5	928.5	129.0	1,088.0	13,455.0	Idaho
126.2	40.2	15.1	67.9	1,028.5	Illinois
67.8	77.7	3.2	13.9	501.0	Indiana
7.7	12.5	2.5	11.1	82.9	Kansas
207.0	208.9	13.2	104.2	2,106.2	Kentucky
108.9	34.6	3.2	33.9	532.9	Louisiana
8.8	5.0	1.4	5.7	113.6	Maine
585.6	514.8	19.0	150.2	5,011.3	Michigan
331.5	856.9	34.4	124.2	5,676.2	Minnesota
389.3	89.6	29.2	95.3	1,317.8	Mississippi
273.6	119.3	19.3	104.1	1,931.2	Missouri
1,080.3	867.8	117.8	978.9	11,001.4	Montana
58.0	2.3	2.6	7.7	260.2	Nebraska
189.8	95.0	84.9	184.0	3,677.1	Nevada
37.7	29.0	13.9	24.5	3,242.8	New Hampshire
643.6	321.9	160.8	875.9	8,775.1	New Mexico
4.4	1.4	0.8	1.3	35.0	New York
718.0	331.8	36.6	228.6	6,158.4	North Carolina
58.4	1.6	4.0	3.2	135.2	North Dakota
234.9	55.1	5.0	61.6	679.5	Ohio
65.4	20.2	14.1	17.8	358.2	Oklahoma
977.1	876.1	236.9	553.0	19,285.2	Oregon
170.9	156.6	23.4	75.4	2,950.3	Pennsylvania
0.0	0.0	2.2	51.6	296.1	Puerto Rico
210.3	57.5	13.1	60.6	944.3	South Carolina
82.9	57.7	6.0	147.0	3,351.9	South Dakota
242.4	183.9	27.8	65.3	2,956.9	Tennessee
232.3	784.4	17.6	77.6	2,302.9	Texas
881.0	883.9	62.4	832.5	15,157.1	Utah
85.5	24.2	31.4	79.2	1,727.7	Vermont
782.1	351.1	36.5	231.1	4,476.5	Virginia
544.1	497.6	177.5	585.2	18,735.1	Washington
202.6	118.4	9.3	43.1	1,353.6	West Virginia
409.5	420.4	14.1	147.9	2,732.5	Wisconsin
591.6	381.6	88.0	310.7	7,453.6	Wyoming
17,278.8	16,299.0	2,711.5	17,343.1	295,473.1	Total

1/ Unlisted States have no Forest Service recreation programs.

2/ One recreation visitor-day (RVD) is the recreation use of National Forest land or water that aggregates 12 visitor-hours. This may entail 1 person for 12 hours, 12 persons for 1 hour, or any equivalent combination of individual or group use, either continuous or intermittent.

Table 12--Trail miles on the National Forest System by State--fiscal years 1991-93 1/

State, Commonwealth, or Territory 2/	1993			1992			1991		
	Total	Constructed	3/ Maintained	Total	Constructed	3/ Maintained	Total	Constructed	3/ Maintained
Alabama	264.5	24.0	153.5	260.1	8.5	130.8	162.9	14.5	133.9
Alaska	896.3	21.0	517.1	833.3	9.7	492.4	867.2	7.5	452.8
Arizona	4,443.3	62.1	673.0	4,260.7	180.3	788.7	3,982.9	116.8	587.1
Arkansas	829.5	24.5	446.7	771.2	60.2	534.0	768.9	26.5	460.1
California	14,822.4	240.7	7,938.1	13,973.2	151.0	7,313.8	14,045.5	348.4	6,553.6
Colorado	9,065.0	174.6	4,260.1	9,358.0	131.1	4,746.6	9,307.3	148.3	4,444.5
Florida	348.9	8.0	161.4	350.8	6.0	223.1	341.3	0.0	341.3
Georgia	705.6	10.3	245.4	700.0	1.0	280.8	626.3	4.6	486.0
Idaho	18,714.1	95.6	11,118.6	19,044.6	175.5	10,396.4	18,459.7	133.6	9,672.3
Illinois	301.7	13.5	95.7	220.0	13.5	49.7	157.0	14.5	79.7
Indiana	157.5	58.0	97.5	146.0	0.0	146.0	146.0	6.0	146.0
Kansas	0.0	0.0	0.0	37.5	2.0	14.5	36.9	0.0	13.9
Kentucky	502.4	11.3	167.0	466.7	18.9	205.4	462.0	23.7	441.6
Louisiana	179.3	45.0	44.0	132.1	12.0	107.0	142.1	3.0	134.5
Maine	222.0	2.0	222.0	120.0	0.0	120.0	120.0	5.0	120.0
Michigan	2,970.7	87.0	1,921.7	2,920.8	99.0	2,497.4	3,193.6	110.3	2,613.4
Minnesota	1,694.0	6.0	1,694.0	2,649.0	53.5	2,649.0	2,600.5	14.0	2,600.5
Mississippi	320.4	17.9	155.1	298.4	32.0	182.9	254.9	1.0	223.6
Missouri	687.0	92.8	687.0	650.0	63.5	619.0	628.0	22.7	628.0
Montana	14,588.1	187.1	9,587.5	14,492.3	163.3	9,169.2	14,135.9	110.7	9,383.1
Nebraska	57.0	3.0	41.0	54.0	1.0	41.0	50.0	0.0	50.0
Nevada	1,633.4	8.7	485.2	1,639.9	9.0	654.0	1,631.5	12.6	853.8
New Hampshire	1,263.7	5.0	1,263.7	1,308.0	47.8	1,308.0	1,308.0	6.9	1,308.0
New Mexico	4,208.4	42.5	1,278.2	4,126.7	63.9	1,270.1	3,942.0	37.4	886.0
New York	37.0	3.0	37.0	31.0	0.3	31.0	31.0	1.2	31.0
North Carolina	1,642.2	16.9	333.1	1,500.1	26.1	369.5	1,433.2	35.5	991.6
North Dakota	38.4	0.0	34.1	34.9	1.5	32.6	37.4	1.5	36.6
Ohio	295.0	22.0	295.0	260.0	30.0	260.0	260.0	20.0	260.0
Oklahoma	183.1	14.5	90.5	148.8	17.0	10.7	145.8	24.0	74.7
Oregon	11,013.1	206.7	9,026.8	11,008.3	105.2	8,303.8	10,530.4	211.0	5,862.7
Pennsylvania	630.5	27.0	574.1	648.8	22.0	555.4	648.8	8.6	334.9
Puerto Rico	21.1	1.0	4.0	21.1	2.5	6.0	26.0	0.0	26.0
South Carolina	316.6	4.1	116.3	316.6	23.3	226.0	373.7	31.3	299.5
South Dakota	235.8	29.7	224.8	234.2	12.3	223.2	251.3	18.3	241.3
Tennessee	716.4	5.9	51.5	716.2	7.9	104.1	673.7	12.5	152.4

See footnotes at end of table

Table 12--Trail miles on the National Forest System by State--fiscal years 1991-93--Continued

State, Commonwealth, or Territory 2/	1993			1992			1991		
	Total	Constructed	3/ Maintained	Total	Constructed	3/ Maintained	Total	Constructed	3/ Maintained
Texas	295.4	5.0	22.0	295.4	5.0	122.0	282.5	12.1	249.0
Utah	6,058.2	91.5	3,298.2	5,184.4	151.0	3,024.8	5,284.4	30.8	2,634.3
Vermont	1,028.0	44.5	832.7	965.2	20.4	769.9	965.2	30.7	711.4
Virginia	1,801.0	33.0	458.8	1,832.9	40.5	379.3	1,839.9	16.5	558.6
Washington	9,089.8	139.6	7,153.4	9,004.9	131.0	6,693.0	8,183.1	129.1	5,718.1
West Virginia	947.3	17.6	349.6	944.6	24.1	443.5	891.4	10.5	277.2
Wisconsin	1,641.5	42.0	1,641.5	1,684.6	31.0	1,349.2	1,314.5	44.6	1,136.3
Wyoming	6,193.0	31.4	3,355.4	6,638.2	21.8	2,988.1	6,041.8	114.8	3,349.3
Total 4/	121,058.6	1,976.0	71,152.3	120,283.5	1,975.6	69,831.9	116,584.5	1,921.0	65,558.6

1/ Includes work accomplished by Human Resource Programs and volunteers.

2/ Unlisted States have no Forest Service recreation programs.

3/ Miles constructed include construction of new trails and reconstruction of existing trails. The predominant activity is reconstruction. Funds used are appropriated, other, and timber receipts.

4/ Totals may not add due to rounding.

5/ Additional constructed/reconstructed trail miles totaling 203.3 were accomplished by contributions (partnerships, volunteers, etc.) other than appropriated funds.



Table 13—Acres of the National Wilderness Preservation System by State—calendar years 1989-93 1/

State, Commonwealth, or Territory 2/	1993	1992	1991	1990	1989
	<i>1,000 acres 3/</i>				
Alabama	33	33	33	33	33
Alaska	5,753	5,753	5,753	5,453	5,453
Arizona	1,345	1,345	1,345	1,345	1,345
Arkansas	117	117	117	116	115
California	4,305	4,302	3,902	3,902	3,921
Colorado	3,148	2,587	2,587	2,587	2,587
Florida	74	74	74	73	73
Georgia	113	113	89	89	89
Idaho	3,962	3,962	3,962	3,960	3,960
Illinois	26	26	26	0	0
Indiana	13	13	13	13	13
Kentucky	16	16	16	16	17
Louisiana	9	9	9	9	9
Maine	12	12	12	12	0
Michigan	92	92	92	92	92
Minnesota	807	803	802	799	799
Mississippi	6	6	6	5	6
Missouri	63	63	63	63	63
Montana	3,372	3,372	3,372	3,372	3,372
Nebraska	8	8	8	8	8
Nevada	786	786	786	788	65
New Hampshire	103	103	103	103	103
New Mexico	1,388	1,388	1,388	1,388	1,388
North Carolina	103	103	103	102	101
Oklahoma	14	14	14	14	14
Oregon	2,080	2,080	2,080	2,080	2,079
Pennsylvania	9	9	9	9	9
South Carolina	17	17	17	17	17
South Dakota	10	10	10	10	10
Tennessee	66	66	66	66	67
Texas	37	35	35	35	36
Utah	774	774	774	774	774
Vermont	59	59	59	59	59
Virginia	87	87	87	87	89
Washington	2,573	2,576	2,571	2,571	2,571
West Virginia	81	81	81	81	81
Wisconsin	42	42	42	42	42
Wyoming	3,080	3,080	3,080	3,080	3,080
Total 4/	34,584	34,017	33,586 5/	33,253	32,540

1/ Includes all changes to the Wilderness Preservation System through the 100th Congress.

2/ Unlisted States have no National Forest System acres in the National Wilderness Preservation System.

3/ Acreage for most States is estimated pending final map compilation; therefore, minor changes may occur between years.

4/ Total acreage is shown. The difference between the total and column sum is due to rounding.

5/ Correction in FY 1991: 10,000 acres should have been included for Boundary Peak on the Inyo National Forest in Nevada.

Table 14—Fuels treatment acreage accomplished by appropriation--fiscal year 1993

Region	Accomplishment			Total
	Forest fire protection	Volunteer and contributed work	Brush disposal funds	
	<i>Acres</i>			
Northern (R-1)	17,984	30	32,563	50,577
Rocky Mountain (R-2)	17,404	0	15,259	32,663
Southwestern (R-3)	68,437	2,001	45,366	115,804
Intermountain (R-4)	7,603	313	22,306	30,222
Pacific Southwest (R-5)	11,679	0	38,755	50,434
Pacific Northwest (R-6)	15,951	1,464	99,564	116,979
Southern (R-8)	242,909	0	0	242,909
Eastern (R-9)	3,125	19	2,792	5,936
Alaska (R-10)	239	0	0	239
Total	385,331	3,827	256,605	645,763

Table 15--Pesticide use report--fiscal year 1993

Common name	Target pest or purpose	Treatment unit	Units treated	Quantity used	
				Pounds 1/ 2/	
Fungicides and fumigants:					
Basamid	Fungi	Acres	5.1	2,149.0	
	Fusarium	Acres	23.7	8,217.0	
Bayleton	Fusiform rust	Acres	1,194.0	.6	
Benlate	Botrytis	Acres	24.0	.1	
	Fungi	Acres	39.0	3.1	
	Fungi	Square Feet	5,000.0	1.0	
	Fungi	Trees	4,675,000.0	.1	
	Nursery blight	Acres	38.8	19.4	
	Benomyl	Botrytis	Acres	15.4	36.5
	Fungi	Acres	27.8	14.3	
	Fusarium	Acres	25.6	3.8	
Borax	Annosus control	Acres	35,056.0	14,630.3	
	Fungi	Acres	7,741.0	4,145.5	
Bravo	Nursery blight	Acres	12.5	18.0	
	Tomato blight	Acres	24.0	.1	
Captan	Botrytis	Acres	25.0	.7	
	Fusarium	Acres	4.8	2.4	
Chlorothalonil	Botrytis	Acres	12.8	19.2	
	Dothistromapini	Acres	7.0	13.9	
	Fungi	Acres	120.4	238.8	
	Other diseases	Acres	11.0	1.5	
Dazomet	Soil pathogens	Acres	57.9	20,586.5	
DCNA	Botrytis	Acres	3.0	3.3	
	Botrytis	Greenhouses	15.0	33.4	
	Fungi	Acres	22.6	22.6	
DCPA	Plants	Acres	48.5	582.0	
Dodine	Fungi	Acres	.1	.1	
Dowfume	Fungi	Acres	9.2	2,677.0	
Etridiazole	Phytophthora	Acres	1.0	.1	
MC33	Fungi	Acres	30.0	393.3	
Metalaxyl	Fungi	Acres	3.5	8.4	
	Phytophthora	Acres	1.0	.2	
	Whitebark root disease	Acres	1,000.0	.1	
	Methyl bromide/ Chloropicrin	Fungi	Acres	30.7	10,861.0
	Soil fumigant	Square feet	5,100.0	51.0	
	Soil pathogens	Acres	71.1	24,829.7	
	Syllit	Fungi	Acres	7.3	9.5
Thiram	Damping-off	Acres	421.0	1.2	
Triadimefon	Keithia blight control	Acres	4.0	1.0	
	Sirroccocus control	Acres	5.0	1.3	
	White pine blister rust	Acres	29.0	1.4	
	Triazole	Fungi	Acres	.4	1.6
Vinclozolin	Botrytis	Acres	1.0	.9	
Total 1993 fungicides and fumigants		Acres	46,154.1		
		Greenhouses	15.0		
		Square feet	10,100.0		
		Trees	4,675,000.0		
			Total Pounds	89,580.6	

See footnotes at end of table.



Table 15—Pesticide use report--fiscal year 1993--Continued

Common name	Target pest or purpose	Treatment unit	Units treated	Quantity used	
				Pounds 1/ 2/	
Herbicides, algicides, and plant growth regulators:					
Accord	Conifer release	Acres	53.0	.2	
	General weeds	Acres	322.0	7.5	
	Noxious weeds	Acres	39.0	5.3	
	Shrubs	Acres	253.0	4.5	
	Site preparation	Acres	1,056.0	2.4	
Arsenal	Conifer release	Acres	7,029.0	1.8	
	Hardwood release	Acres	677.0	.2	
	Site preparation	Acres	4,599.0	1.1	
	Wildlife habitat improvement	Acres	753.0	.9	
Arsenal/Oust	Conifer release	Acres	15.0	6.0	
Balan	General weeds	Acres	1.0	1.5	
Banvel	Noxious weeds	Acres	143.5	209.7	
	Rights-of-way	Acres	176.0	220.0	
Banvel/Tordon	Noxious weeds	Acres	4.0	12.0	
Bifenox	Plants	Acres	17.8	53.4	
Bordeaux	General weeds	Acres	2.0	1.3	
Bromacil	Rights-of-way	Acres	195.6	32.0	
Chlosulfuron	Noxious weeds	Acres	12.0	0.6	
Clopyralid	Noxious weeds	Acres	251.5	15.9	
Curtail	Noxious weeds	Acres	9.0	.8	
Cutrine	Algae control	Acres	2.0	12.0	
Dacthal 3/	General weeds	Acres	3.8	36.0	
	Nursery blight	Acres	291.0	9.5	
Dicamba	Noxious weeds	Acres	576.5	301.0	
	Plants	Acres	8.3	7.4	
Dicamba/Clopyralid	Noxious weeds	Acres	142.0	188.0	
Diquat	Aquatic weeds	Acres	2.0	5.0	
Diuron	Range management	Acres	2.0	18.0	
Triclopyr	Conifer release	Acres	23,242.0	20,344.0	
	General weeds	Acres	697.0	1.9	
	Grape vine control	Acres	322.0	.1	
	Hardwood release	Acres	2,564.0	8.0	
	Noxious weeds	Acres	508.0	1,640.3	
	Range management	Acres	39.0	4.1	
	Shrubs	Acres	258.0	15.2	
	Site preparation	Acres	20,556.0	18,911.0	
	Wildlife habitat improvement	Acres	8,818.0	8,112.0	
	Glyphosate	Conifer release	Acres	6,012.3	7,344.3
		General weeds	Acres	697.6	433.3
		Grass	Acres	676.0	223.0
Hardwood release		Acres	192.0	576.0	
Release		Acres	142.5	285.0	
Noxious weeds		Acres	1,266.6	992.6	
Plants		Acres	66.1	369.2	
Range management		Acres	13.0	26.0	
Shrubs		Acres	102.7	10.0	
Site preparation		Acres	1,351.0	679.7	
Wildlife habitat improvement		Acres	5.0	13.3	

See footnotes at end of table.

Table 15--Pesticide use report--fiscal year 1993--Continued

Common name	Target pest or purpose	Treatment unit	Units treated	Quantity used
				Pounds 1/ 2/
Herbicides, algicides, and plant growth regulators: (Continued)				
Glyphosate/Triclopyr	Conifer release	Acres	1,605.0	1,548.5
Goal	General weeds	Acres	39.0	1.6
	Nursery blight	Acres	1.5	.3
Hexazinone	Conifer release	Acres	6,394.1	13,164.7
	General weeds	Acres	5.0	10.0
	Grass	Acres	76.0	26.7
	Shrubs	Acres	320.0	560.0
Krenite	General weeds	Acres	7.0	5.7
	Hardwood release	Acres	323.0	13.2
Metsulfuron	Noxious weeds	Acres	100.0	40.0
Napropamide	General weeds	Acres	34.3	51.5
Oryzalin	Range management	Acres	3.0	8.0
Oust	Conifer release	Acres	3,164.0	.2
	General weeds	Acres	7.0	.2
	Shrubs	Acres	60.0	.8
	Site preparation	Acres	15.0	.1
Oxyfluorfen	General weeds	Acres	94.0	18.4
	Plants	Acres	24.1	9.9
	Range management	Acres	1.0	3.0
Pathfinder	Shrubs	Acres	10.0	1.9
Pathway	Noxious weeds	Acres	360.0	37.5
Picloram	General weeds	Acres	50.5	66.0
	Noxious weeds	Acres	9,056.5	3,941.9
	Pinon/Juniper control	Acres	2.4	2.4
Poast	General weeds	Acres	21.0	.2
Pronone	Conifer release	Acres	3,495.0	5.2
	General weeds	Acres	7.0	.3
	Noxious weeds	Acres	10.0	1.0
	Site prepatation	Acres	4,666.0	13.6
	Wildlife habitat improvement	Acres	20.0	.2
Rodeo	General weeds	Acres	6.0	.7
	Noxious weeds	Acres	273.0	64.7
	Shrubs	Acres	50.0	1.6
	Site preparation	Acres	1.0	2.0
Seven	General weeds	Acres	6.5	5.9
Simazine	Noxious weeds	Greenhouses	15.0	2.0
	Range management	Acres	2.0	24.0
Tebuthiuron	General weeds	Acres	100.0	40.4
Tordon	Noxious weeds	Trees	745.4	370.8
	Rights-of-way	Acres	33.0	59.0
Tordon/weed-out	Noxious weeds	Acres	59.2	20.2
Transline	Noxious weeds	Acres	68.0	1.1
Velpar/Oust	Conifer release	Acres	1.0	.5

See footnotes at end of table.

Table 15--Pesticide use report--fiscal year 1993--Continued

Common name	Target pest or purpose	Treatment unit	Units treated	Quantity used
				Pounds 1/ 2/
Herbicides, algicides, and plant growth regulators: (Continued)				
2,4-D	General weeds	Acres	560.3	899.0
	Noxious weeds	Acres	2,830.8	3,620.8
	Range management	Acres	200.0	400.0
	Rights-of-way	Acres	176.0	88.0
2,4-D/Banvel	General weeds	Acres	100.0	250.0
	Noxious weeds	Acres	404.8	143.5
2,4-D/Banvel/Tordon	Noxious weeds	Acres	1.0	4.2
2,4-D/Clopyralid	Noxious weeds	Acres	233.0	194.1
2,4-D/Curtail	Noxious weeds	Acres	183.0	2.4
2,4-D/Dicamba	General weeds	Acres	135.0	250.0
	Noxious weeds	Acres	3,849.0	8,205.6
2,4-D/Dicamba/Picloram	Noxious weeds	Acres	337.0	413.0
2,4-D/Glyphosate	Noxious weeds	Acres	197.0	220.6
2,4-D/Picloram	Noxious weeds	Acres	7,155.1	7,036.9
2,4-D/Picloram/Clopyralid	Noxious weeds	Acres	.5	6.8
2,4-D/Tordon	Noxious weeds	Acres	2,560.5	1,676.8
Total 1993 herbicides, algicides, and plant growth regulators		Acres	143,892.2	
		Greenhouses	15.0	
		Trees	1,138.0	
			Total Pounds	105,295.3

See footnotes at end of table.



Table 15--Pesticide use report--fiscal year 1993--Continued

Common name	Target pest or purpose	Treatment unit	Units treated	Quantity used		
			Pounds	1/	2/	
Insecticides, acaricides, and pheromones:						
Acephate	Aphids	Greenhouses	1.0		.5	
	Aphids	Square feet	3,196.0		.1	
	Cutworms	Acres	.0		.0	
	Western spruce budworm	Acres	20.0		.2	
	Western spruce budworm	Trees	798.0		19.9	
Amdro	Ants	Acres	245.0		48.4	
Asana	Miscellaneous insects	Trees	64.0		1.3	
	Wood borer	Acres	20.0		.1	
Bendiocarb	Fleas	Acres	816.0		10.8	
Benzene acetate	Miscellaneous insects	Trees	43.0		.1	
Bt 4/	Gypsy moth	Acres	8,160.0	195,840.0	BIU	
	Miscellaneous insects	Acres	24.0	768.0	BIU	
	Mosquitoes	Acres	160.0	1,225.0	BIU	
Carbaryl	Aphids	Acres	1.0		.6	
	Aphids	Greenhouses	1.0		.6	
	Bark beetles	Acres	2.0		50.0	
	Bark beetles	Tree groups	11.0		33.8	
	Miscellaneous insects	Trees	664.0		152.0	
	Mites	Square feet	1,000.0		.1	
	Mountain pine beetle	Acres	10,238.0		1,231.0	
	Mountain pine beetle	Trees	1,138.0		38.0	
	Pine tip moth	Acres	3.5		7.0	
	Chlorpyrifos	Miscellaneous insects	Acres	27.1		26.0
		Termites	Buildings	1.0		1.3
Coumaphos	Miscellaneous insects	Head cattle	3,800.0		160.0	
	Mites	Head cattle	12,000.0		22.5	
Cyfluthrin	Miscellaneous insects	Trees	64.0		.5	
DDVP	Cone beetles	Pheromone traps	40.0		.1	
Diazinon	Fleas	Acres	155.0		22.4	
	Miscellaneous insects	Acres	52.0		24.4	
	Nursery pests	Acres	18.0		.3	
Dienochlor	Mites	Greenhouses	1.0		.1	
	Mites	Square feet	808.0		.3	
Dimethoate	Tip moths	Acres	17.3		8.7	
Dimlin	Gypsy moth	Acres	688.0		.1	
Dipel	Gypsy moth	Acres	6,130.0		24.0	
Disrupt	Gypsy moth	Acres	2,248.0		.3	
Dursban	Bark beetles	Acres	839.0		.1	
	Bark beetles	Trees	1,576.0		.1	
Esfenvalerate	Cone beetles	Trees	3.0		.1	
	Cone and seed insects	Trees	3,728.0		1.5	
Fenbutatin-oxide	Mites	Greenhouses	1.0		.1	
	Mites	Square feet	1,060.0		.0	
Furadan	Tip moths	Trees	500.0		.0	
Gypchek	Prevent defoliation	Acres	3,760.0		117.9	
Lindane	Miscellaneous insects	Grafts	400.0		.4	
	Southern pine beetle	Acres	56.0		3.7	
	Southern pine beetle	Trees	2,794.00		.1	

See footnotes at end of table.

Table 15--Pesticide use report--fiscal year 1993--Continued

Common name	Target pest or purpose	Treatment unit	Units treated	Quantity used	
				Pounds	1/
Insecticides, acaricides, and pheromones: (Continued)					
Malathion	Aphids	Acres	1.0		.1
	Conifer release	Trees	20.0		.1
Mavrik	Greenhouse insects	Square feet	29,000.0		.1
MCH	Douglas-fir beetle	Acres	24.0		1.3
	Miscellaneous insects	Acres	120.0		12.4
Orthene	Cone and seed insects	Acres	44.0		6.0
Permethrin	Miscellaneous insects	Acres	17.0		2.9
Potassium	Aphids	Acres	1.0		22.8
	Aphids	Greenhouses	1.0		1.0
Pydrin	Cone and seed insects	Trees	450.0		.1
Verbenone	Miscellaneous insects	Acres	280.0		12.5
	Mountain pine beetle	Acres	10.0		.8
Zinc phosphide	Miscellaneous insects	Acres	3.0		.1
Total 1993 insecticides, acaricides, and pheromones		Acres	34,180.0		
		Buildings	1.0		
		Grafts	400.0		
		Greenhouses	5.0		
		Head of cattle	15,800.0		
		Pheromone traps	40.0		
		Square feet	35,064.0		
		Tree groups	11.0		
		Trees	11,842.0		
			Total Pounds	2,046.0	

See footnotes at end of table.

Common name	Target pest or purpose	Treatment unit	Units treated	Quantity used
				Pounds 1/ 2/
Predacides, piscicides, and repellants:				
Fish tox	Fish	Stream miles	8.8	10.0
Gustafson	Mice	Acres	4,550.0	.0
Noxfish	Fish	Stream miles	8.8	10.0
	Undesirable fish	Acres	30.0	.2
B.G.R.	Deer	Acres	6,894.0	454.4
Rotenone	Fish	Stream miles	8.0	.4
	Other diseases	Acre feet	11.0	1.5
	Other diseases	Stream miles	19.0	59.2
Thiram	Deer	Acres	6.0	10.2
Total 1993 predacides, piscicides and repellants		Acre feet	11.0	
		Acres	11,480.0	
		Stream miles	44.5	
			Total Pounds	546.0

See footnotes at end of table.



Table 15--Pesticide use report--fiscal year 1993--Continued

Common name	Target pest or purpose	Treatment unit	Units treated	Quantity used	
				Pounds	1/
Rodenticides:					
Chlorophacinone	Ground squirrel	Acres	30.0		.2
Diphacinone	Ground squirrel	Acres	230.0		2.8
	Prairie dogs	Acres	127.0		.0
Strychnine	Other predators	Acres	369.0		.3
	Gophers	Acres	57,434.6		240.8
Zinc phosphide	Prairie	Acres	4,568.0		210.4
Total 1993 rodenticides		Acres	62,758.6		454.6
Grand total 1993 units treated		Acre feet	11.0		
		Acres	288,976.9		
		Buildings	1.0		
		Grafts	400.0		
		Greenhouses	35.0		
		Head of cattle	15,800.0		
		Pheromone Traps	40.0		
		Square feet	45,164.0		
		Stream miles	44.5		
		Tree groups	11.0		
		Trees	4,686,842.0		
			Grand total pounds	213,726.8	

1/ Pounds of active ingredient, unless other units are indicated. BIU = billion international units.

2/ All very small quantities have been rounded up to .1 pounds.

3/ Registered trademark; no common name.

4/ Bt = *Bacillus thuringiensis*.

Table 16—Reforestation funding and accomplishments by funding source--fiscal years 1989-93

	Appropriated	Knutson-Vandenberg	Total
1989			
Million dollars 1/	65.0 2/	129.5	194.5
1,000 acres	148.6	327.3	475.9 3/
Constant dollars/acre	437.4	395.7	408.7 4/
1990			
Million dollars 1/	54.5	125.0 5/	179.5
1,000 acres	145.0	353.1	498.1 6/
Constant dollars/acre	375.9	354.0	360.4 4/
1991			
Million dollars 1/	53.0	110.0	163.0
1,000 acres	138.2	350.5	488.7 7/
Constant dollars/acre	383.5	313.8	333.7 4/
1992			
Million dollars 1/	46.4	81.1	127.5
1,000 acres	162.6	319.4	482.0 8/
Constant dollars/acre	285.4	254.0	264.5 4/
1993			
Million dollars 1/	47.0	90.8	137.8
1,000 acres	159.3	292.9	452.2 9/
Constant dollars/acre	295.0	310.0	304.7 4/

1/ All dollars are constant 1993. No General Administration funds included. Does not include funds for nursery and tree improvement.

2/ Includes \$9.7 million of resource management excess timber receipts. These funds are to be used to reforest lands damaged by forest fires in 1987 and 1988.

3/ Includes 53,000 acres of certified natural regeneration without site preparation reported as established in FY 1989, but does not include 16,300 acres of other carryover reforestation.

4/ Weighted average.

5/ Although \$152 million were authorized, only \$125.0 were obligated. The cost/acre is based upon the obligated amount.

6/ Includes 59,000 acres of certified natural regeneration without site preparation reported as established in FY 1990.

7/ Includes 65,687 acres of certified natural regeneration without site preparation, but does not include 14,477 acres accomplished with contributed funding.

8/ Includes 98,369 acres of certified natural regeneration without site preparation, but does not include 9,973 acres accomplished with contributed funding.

9/ Includes 108,314 acres of certified natural regeneration without site preparation, but does not include 21,889 acres accomplished with contributed funding.

Table 17—Reforestation program needs--fiscal years 1993-95

	Current or anticipated	Annual program appropriated funds 1/	
		1,000 acres	Million dollars
10/1/92 balance	1,069.0		
Fiscal year 1993			
New needs 2/	383.0		
Accomplishments	-474.0	159.3	47.0
10/1/93 balance	978.7		
Fiscal year 1994			
New needs 2/	350.0		
Projected accomplishments	-374.0	95.6	43.9
10/1/94 balance	954.0		
Fiscal year 1995			
New needs 2/	325.0		
Projected accomplishments	-358.0		
10/1/95 balance	921.7		

1/ Includes Reforestation Trust Fund pursuant to P.L. 96-451, as amended.

2/ New needs are the results of timber harvests, regeneration failures, and natural disasters such as fires, storms, insects, diseases, and other changes.



Table 18—Reforestation needs as of October 1, 1993, by State, national forest, and site productivity class

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/				Total acres
	0-49	50-84	85-119	120+	
Alabama					
NFs in Alabama (subtotal)	86	1,247	3,978	515	5,826
Alaska					
Chugach	0	172	0	0	172
Tongass-Chatham	171	1,275	3,862	9,794	15,102
Tongass-Ketchikan	0	281	1,270	20,267	21,818
Tongass-Stikine	83	156	618	9,940	10,797
Subtotal	254	1,884	5,750	40,001	47,889
Arizona					
Apache-Sitgreaves	4,025	5,098	190	0	9,313
Coconino	14,028	4,106	0	0	18,134
Coronado	0	8	0	0	8
Kaibab	4,914	2,474	0	0	7,388
Prescott	118	9	0	0	127
Tonto	898	0	0	0	898
Subtotal	23,983	11,695	190	0	35,868
Arkansas					
Ouachita	45	2,868	4,447	39	7,399
Ozark-St. Francis	228	5,446	1,886	11	7,571
Subtotal	273	8,314	6,333	50	14,970
California					
Angeles	254	511	272	0	1,037
Cleveland	0	158	0	0	158
Eldorado	0	124	1,338	10,398	11,860
Inyo	0	123	128	0	251
Klamath	926	3,427	4,189	3,940	12,482
Lake Tahoe Basin	0	47	1,454	0	1,501
Lassen	17	9,878	4,111	2,931	16,937
Los Padres	0	21	5	0	26
Mendocino	121	1,615	1,366	817	3,919
Modoc	25	1,823	899	550	3,297
Plumas	0	1,008	12,148	1,846	15,002
Rogue River	0	236	0	0	236
San Bernardino	346	389	29	0	764
Sequoia	18	1,594	618	5,292	7,522
Shasta	0	165	611	1,372	2,148
Sierra	0	174	937	1,421	2,532
Siskiyou	0	0	62	0	62
Six Rivers	0	4	1,236	1,136	2,376

See footnotes at end of table.

Table 18—Reforestation needs as of October 1, 1993, by State, national forest, and site productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/				Total acres
	0-49	50-84	85-119	120+	
California (continued)					
Stanislaus	2,165	13,744	26,968	22,525	65,402
Tahoe	0	931	2,444	4,073	7,448
Toiyabe	23	0	0	0	23
Trinity	2	1,724	913	1,382	4,021
Subtotal	3,897	37,696	59,728	57,683	159,004
Colorado					
Arapaho and Roosevelt	9,312	206	0	0	9,518
Grand Mesa, Uncompahgre, and Gunnison	6,508	2,653	169	34	9,364
Pike and San Isabel	2,032	304	0	0	2,336
Rio Grande	1,387	2,185	155	0	3,727
Routt	5,856	1,890	133	0	7,879
San Juan	1,668	2,607	258	0	4,533
White River	1,220	988	157	0	2,365
Subtotal	27,983	10,833	872	34	39,722
Florida					
NFs in Florida (subtotal)	0	0	3,179	1,461	4,640
Georgia					
Chattahoochee and Oconee (subtotal)	0	0	2,978	437	3,415
Idaho					
Boise	2,931	26,521	5,285	2,220	36,957
Caribou	0	916	28	0	944
Challis	0	402	0	0	402
Clearwater	4,090	353	2,251	4,538	11,232
Idaho Panhandle	12,088	2,078	6,385	6,000	26,551
Kootenai	1	6	48	0	55
Nez Perce	782	968	4,686	2,213	8,649
Payette	1,734	1,834	4,795	39	8,402
Salmon	8,630	303	0	0	8,933
Sawtooth	190	330	0	0	520
Targhee	805	14,265	0	56	15,126
Subtotal	31,251	47,976	23,478	15,066	117,771
Illinois					
Shawnee (subtotal)	0	345	298	18	661
Indiana					
Hoosier (subtotal)	0	0	1,147	590	1,737

See footnotes at end of table.

Table 18--Reforestation needs as of October 1, 1993, by State, national forest, and site productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/				Total acres
	0-49	50-84	85-119	120+	
Kentucky					
Daniel Boone (subtotal)	0	1,764	3,330	241	5,335
Louisiana					
Kisatchie (subtotal)	34	758	79	2,146	3,017
Maine					
White Mountain (subtotal)	0	0	0	12	12
Michigan					
Hiawatha	2,919	4,511	477	54	7,961
Huron-Manistee	760	1,627	399	25	2,811
Ottawa	1,483	11,858	2,182	29	15,552
Subtotal	5,162	17,996	3,058	108	26,324
Minnesota					
Chippewa	0	201	0	0	201
Superior	0	10,520	1,188	585	12,293
Subtotal	0	10,721	1,188	585	12,494
Mississippi					
NFs in Mississippi (subtotal)	219	718	2,307	6,333	9,577
Missouri					
Mark Twain (subtotal)	0	11,329	61	0	11,390
Montana					
Beaverhead	427	453	28	0	908
Bitterroot	2,330	873	257	24	3,484
Custer	2,971	113	163	0	3,247
Deerlodge	1,592	245	469	0	2,306
Flathead	6,848	1,102	2,253	335	10,538
Gallatin	898	3,030	34	8	3,970
Helena	2,062	122	178	2	2,364
Kootenai	11,470	3,358	4,666	1,222	20,716
Lewis and Clark	1,184	104	25	0	1,313
Lolo	6,973	3,703	1,638	318	12,632
Subtotal	36,755	13,103	9,711	1,909	61,478
New Hampshire					
White Mountain (subtotal)	1,366	2,518	1,005	91	4,980

See footnotes at end of table.



Table 18—Reforestation needs as of October 1, 1993, by State, national forest, and site productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/				Total acres
	0-49	50-84	85-119	120+	
New Mexico					
Carson	1,222	256	0	0	1,478
Cibola	1,470	56	0	0	1,526
Gila	1,860	468	0	0	2,328
Lincoln	0	1,340	221	0	1,561
Santa Fe	5,008	1,105	0	0	6,113
Subtotal	9,560	3,225	221	0	13,006
New York					
Green Mountain (subtotal)	0	6	0	8	14
North Carolina					
NFs in North Carolina (subtotal)	377	2,716	234	144	3,471
Ohio					
Wayne (subtotal)	0	0	907	1,369	2,276
Oklahoma					
Ouachita (subtotal)	0	100	27	289	416
Oregon					
Deschutes	18,396	8,414	831	204	27,845
Fremont	8,068	11,509	254	30	19,861
Klamath	10	22	99	245	376
Malheur	2,791	22,503	0	0	25,294
Mt. Hood	786	9,547	2,016	1,230	13,579
Ochoco	11,545	5,427	142	0	17,114
Rogue River	0	1,435	6,490	704	8,629
Siskiyou	94	60	2,085	861	3,100
Siuslaw	0	0	0	1,498	1,498
Umatilla	1,077	15,759	1,482	1,118	19,436
Umpqua	148	1,805	1,891	2,290	6,134
Wallowa-Whitman	10,275	13,522	4,931	35	28,763
Willamette	48	1,998	6,454	9,327	17,827
Winema	4,211	15,606	8,751	625	29,193
Subtotal	57,449	107,607	35,426	18,167	218,649
Pennsylvania					
Allegheny (subtotal)	3,670	1,527	0	4	5,201
Puerto Rico					
Caribbean (subtotal)	0	0	41	118	159
South Carolina					
Francis Marion and Sumter (subtotal)	0	0	6,361	2,065	8,426

See footnotes at end of table.

Table 18—Reforestation needs as of October 1, 1993, by State, national forest, and site productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/				Total acres
	0-49	50-84	85-119	120+	
South Dakota					
Black Hills (subtotal)	30,492	6,452	0	22	36,966
Tennessee					
Cherokee (subtotal)	0	944	1,414	3,556	5,914
Texas					
NFs in Texas (subtotal)	0	4,028	2,204	359	6,591
Utah					
Ashley	13,891	0	0	0	13,891
Dixie	3,346	676	0	0	4,022
Fishlake	29	290	5	0	324
Manti-LaSal	0	309	100	0	409
Uinta	0	0	275	0	275
Wasatch-Cache	0	167	0	0	167
Subtotal	17,266	1,442	380	0	19,088
Vermont					
Green Mountain (subtotal)	0	0	5	0	5
Virginia					
George Washington	1,237	145	9	97	1,488
Jefferson	490	3,326	129	776	4,721
Subtotal	1,727	3,471	138	873	6,209
Washington					
Colville	1,022	5,481	2,538	309	9,350
Gifford Pinchot	0	1,570	9,402	1,295	12,267
Idaho Panhandle	322	0	653	34	1,009
Mt. Baker-Snoqualmie	0	322	726	129	1,177
Okanogan	2,218	3,002	995	0	6,215
Olympic	0	240	1,250	578	2,068
Umatilla	70	2,302	35	371	2,778
Wenatchee	148	2,415	4,308	128	6,999
Subtotal	3,780	15,332	19,907	2,844	41,863
West Virginia					
George Washington	62	47	10	149	268
Monongahela	94	670	1,028	391	2,183
Subtotal	156	717	1,038	540	2,451

See footnotes at end of table.

Table 18—Reforestation needs as of October 1, 1993, by State, national forest, and site productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/				Total acres
	0-49	50-84	85-119	120+	
Wisconsin					
Chequamegon	2,297	5,185	968	178	8,628
Nicolet	481	2,287	762	306	3,836
Subtotal	2,778	7,472	1,730	484	12,464
Wyoming					
Bighorn	1,734	651	0	0	2,385
Black Hills	8,676	8,394	38	0	17,108
Bridger-Teton	0	152	2,476	0	2,628
Medicine Bow	5,429	536	0	0	5,965
Shoshone	465	627	0	90	1,182
Wasatch	0	112	0	0	112
Subtotal	16,304	10,472	2,514	90	29,380
Total	274,822	344,408	201,217	158,212	978,659

1/ Site productivity class refers to the amount of wood produced in cubic feet per acre per year in a natural unmanaged stand.

2/ Unlisted States had no reforestation needs as of October 1, 1993.



Table 19—Reforestation and timber stand improvement acreages certified as satisfactorily stocked by State and national forest—fiscal year 1993

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber stand improvement				
	Artificial regeneration		Natural regeneration			Ferti-				Total Acres
	Planted	Seeded	w/site prep. 2/	w/o site prep. 2/	Total	Cleaning	Release	Thinning	zation	
Alabama										
NFs in Alabama (subtotal)	4,024	0	610	0	4,634	0	3,841	71	0	3,912
Alaska										
Tongass-Chatham	366	0	0	2,595	2,961	0	0	440	0	440
Tongass-Ketchikan	294	0	0	7,029	7,323	0	0	2,206	0	2,206
Tongass-Stikine	365	0	0	3,697	4,062	0	0	181	0	181
Subtotal	1,025	0	0	13,321	14,346	0	0	2,827	0	2,827
Arizona										
Apache-Sitgreaves	0	0	0	4,612	4,612	0	0	0	0	0
Coconino	0	0	0	490	490	0	0	0	0	0
Coronado	0	0	0	112	112	0	0	0	0	0
Kaibab	85	0	876	560	1,521	0	0	0	0	0
Prescott	65	0	0	0	65	0	0	228	0	228
Tonto	0	0	0	673	673	0	0	0	0	0
Subtotal	150	0	876	6,447	7,473	0	0	228	0	228
Arkansas										
Ouachita	9,791	0	1,289	18	11,098	0	3,174	827	0	4,001
Ozark-St. Francis	1,130	0	1,753	15	2,898	0	1,683	1,332	0	3,015
Subtotal	10,921	0	3,042	33	13,996	0	4,857	2,159	0	7,016
California										
Angeles	0	0	0	0	0	0	652	33	0	44
Cleveland	18	0	0	0	18	0	97	0	0	107
Eldorado	4,867	0	30	2	4,899	0	8,210	1,371	0	9,581
Inyo	803	0	0	0	803	0	83	467	0	550
Klamath	11,942	0	55	94	12,091	0	4,244	1,340	0	5,584
Lake Tahoe Basin	0	0	0	0	0	0	0	440	0	440
Lassen	33	0	0	0	33	0	3,410	4,196	0	7,606
Mendocino	37	0	0	26	63	0	3,833	314	1,073	24

See footnotes at end of table.

Table 19--Reforestation and timber stand improvement acreages certified as satisfactorily stocked by State and national forest--fiscal year 1993--Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation				Timber stand improvement						
	Artificial regeneration		Natural regeneration		Total Acres	Cleaning	Release	Thinning	Fertili- zation	Pruning	Total Acres
	Planted	Seeded	w/site prep. 2/	w/o site prep. 2/							
California (continued)											
Modoc	39	0	0	0	39	0	617	4,632	0	0	5,249
Plumas	1,301	0	9	321	1,631	0	1,369	779	0	0	2,148
San Bernardino	0	0	0	0	0	0	169	244	103	196	712
Sequoia	994	0	0	85	1,079	0	6,479	619	0	0	7,098
Shasta	3,647	0	0	4	3,651	0	2,460	188	0	0	2,648
Sierra	1,442	0	62	0	1,504	0	5,794	484	0	0	6,278
Siskiyou	617	0	0	0	617	0	0	0	0	0	0
Six Rivers	1020	0	0	48	1,068	0	784	308	0	0	1,092
Stanislaus	493	0	30	0	523	0	4,737	87	0	0	4,824
Tahoe	1,525	0	19	555	2,099	0	4,734	602	0	0	5,336
Trinity	1,997	0	0	0	1,997	0	5,141	391	0	0	5,532
Subtotal	30,775	0	205	1,135	32,115	0	52,813	16,495	1,176	371	70,855
Colorado											
Arapaho and Roosevelt	0	0	227	16,201	16,428	0	0	0	0	0	0
Grand Mesa, Uncompahgre, and Gunnison	144	205	200	2,274	2,823	0	87	50	0	0	137
Manti-LaSal	0	0	0	0	0	0	0	138	0	0	138
Pike and San Isabel	29	50	0	385	464	0	199	0	0	0	199
Rio Grande	0	0	0	200	200	0	0	0	0	0	0
Routt	16	349	284	2,337	2,986	0	0	558	0	0	558
San Juan	0	0	472	965	1,437	0	173	64	0	0	237
White River	4	0	0	467	471	0	432	0	0	0	432
Subtotal	193	604	1,183	22,829	24,809	0	891	810	0	0	1,701
Florida											
NFs in Florida (subtotal)	6,937	7,523	0	1,704	16,164	0	526	0	898	0	1,424
Georgia											
Chattahoochee- Oconee (subtotal)	3,885	0	1,205	230	5,320	0	3,805	999	0	0	4,804

See footnotes at end of table.

Table 19--Reforestation and timber stand improvement acreages certified as satisfactorily stocked by State and national forest--fiscal year 1993--  
Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation				Timber stand improvement					Total Acres
	Artificial regeneration Planted	Seeded	Natural regeneration w/site prep. 2/ w/o site prep. 2/	Total	Cleaning	Release	Thinning	Fertili- zation	Pruning	
Idaho										
Boise	2,859	0	29	3,284	0	0	4,997	0	0	4,997
Caribou	0	0	0	0	4	34	47	0	0	85
Challis	97	0	26	346	0	83	0	0	0	83
Clearwater	3,161	0	215	1,164	0	426	243	0	134	803
Idaho Panhandle	4,573	0	141	4,926	0	756	3,579	558	485	5,378
Nez Perce	3,186	0	610	4,404	0	272	1,030	0	62	1,364
Payette	2,377	0	0	2,377	0	100	1,818	0	0	1,918
Salmon	298	0	798	1,004	0	229	371	0	0	600
Targhee	535	0	2,096	2,631	0	0	424	0	0	424
Subtotal	17,086	0	3,915	3,607	4	1,900	12,509	558	681	15,652
Illinois										
Shawnee (subtotal)	0	0	27	0	0	48	0	0	0	48
Kentucky										
Daniel Boone (subtotal)	1,051	0	3,971	0	0	958	73	0	0	1,031
Louisiana										
Kisatchie (subtotal)	6,785	0	159	40	0	1,212	454	0	0	1,666
Michigan										
Hiawatha	1,011	66	1,414	558	0	909	53	0	681	1,643
Huron-Manistee	745	81	3,227	1,568	0	176	257	0	0	433
Ottawa	664	0	3,732	3,862	0	376	0	0	0	376
Subtotal	2,420	147	8,373	5,988	0	1,461	310	0	681	2,452
Minnesota										
Chippewa	340	10	7,001	514	0	474	0	0	23	497
Superior	708	30	1,600	6,194	0	617	0	0	0	617
Subtotal	1,048	40	8,601	6,708	0	1,091	0	0	23	1,114

See footnotes at end of table.





Table 19—Reforestation and timber stand improvement acreages certified as satisfactorily stocked by State and national forest—fiscal year 1993--  
Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber stand improvement						
	Artificial regeneration		Natural regeneration			Total Acres	Cleaning	Release	Thinning	Fertili- zation	Pruning	Total Acres
	Planted	Seeded	w/site prep. 2/	w/o site prep. 2/	Total							
Ohio												
Wayne-Hoosier (subtotal)	106	0	92	823	1,021	0	234	0	0	0	0	234
Oklahoma												
Ouachita (subtotal)	1,142	0	124	143	1,409	0	0	0	0	0	0	0
Oregon												
Deschutes	4,394	0	1,397	1,060	6,851	0	59	2,310	0	0	0	2,369
Fremont	2,660	0	213	17	2,890	0	544	1,885	0	0	0	2,429
Klamath	35	0	5	0	40	0	14	0	0	0	0	14
Malheur	1,563	0	0	282	1,845	0	0	4,839	0	0	0	4,839
Mt. Hood	4,087	0	399	90	4,576	0	0	2,951	3,141	612	0	6,704
Ochoco	1,904	0	0	48	1,952	0	0	0	0	0	0	0
Rogue River	3,910	0	0	45	3,955	0	0	0	0	0	0	0
Siskiyou	5,181	0	0	71	5,252	0	925	831	1,082	0	0	2,838
Siuslaw	3,588	0	0	0	3,588	0	993	1,192	0	75	0	2,260
Umatilla	4,854	0	326	1,836	7,016	0	0	1,307	0	0	0	1,307
Umpqua	7,020	0	0	334	7,354	0	16	1,782	2,527	445	0	4,770
Wallowa-Whitman	5,263	94	2,044	4,490	11,891	0	1,744	715	0	48	0	2,507
Willamette	16,783	0	0	219	17,002	0	893	3,272	4,311	751	0	9,227
Winema	3,216	0	266	35	3,517	0	0	0	0	0	0	0
Subtotal	64,458	94	4,650	8,527	77,729	0	5,188	21,084	11,061	1,931	0	39,264
Pennsylvania												
Allegheny (subtotal)	0	0	1,116	537	1,653	0	0	0	0	0	0	0
South Carolina												
Francis Marion and Sumter (subtotal)	6,746	0	171	5,651	12,568	0	1,878	923	0	0	0	2,801
South Dakota												
Black Hills (subtotal)	0	0	0	11,614	11,614	0	0	7,360	0	0	0	7,360
Tennessee												
Cherokee (subtotal)	1,494	0	758	82	2,334	0	1,319	0	0	0	0	1,319

See footnotes at end of table.

Table 19--Reforestation and timber stand improvement acreages certified as satisfactorily stocked by State and national forest--fiscal year 1993--  
Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber stand improvement				
	Artificial regeneration		Natural regeneration			Fertili-				Total Acres
	Planted	Seeded	w/site prep. 2/	w/o site prep. 2/	Total	Cleaning	Release	Thinning	Pruning	
Texas										
NFs in Texas (subtotal)	5,665	0	666	1,234	7,565	0	0	1,511	0	1,511
Utah										
Ashley	0	0	0	1,861	1,861	0	0	0	0	0
Dixie	3,422	0	0	1,289	4,711	0	0	2,214	0	2,214
Manti-LaSal	121	0	0	0	121	0	0	225	0	225
Uinta	560	0	0	231	791	0	0	0	0	0
Wasatch	0	0	0	249	249	0	0	219	0	219
Subtotal	4,103	0	0	3,630	7,733	0	0	2,658	0	2,658
Vermont										
Green Mountain (subtotal)	35	0	361	88	484	0	7	7	0	14
Virginia										
George Washington	588	0	1,633	0	2,221	0	809	0	0	809
Jefferson	390	0	1,352	614	2,356	0	1,309	775	0	2,084
Subtotal	978	0	2,985	614	4,577	0	2,118	775	0	2,893
Washington										
Colville	5,352	0	1,811	489	7,652	160	0	964	0	1,124
Gifford Pinchot	9,621	0	0	230	9,851	0	0	1,216	0	1,216
Idaho Panhandle	459	0	29	0	488	0	12	49	0	61
Mt. Baker-Snoqualmie	2,686	0	0	223	2,909	0	0	674	130	804
Okanogan	1,080	0	814	689	2,583	0	0	179	46	268
Olympic	5,110	0	0	566	5,676	0	0	882	2,233	3,155
Umatilla	458	0	0	162	620	0	0	613	0	613
Wenatchee	611	0	310	1,544	2,465	0	353	539	85	977
Subtotal	25,377	0	2,964	3,903	32,244	160	365	5,116	2,361	8,218

See footnotes at end of table.



Table 19--Reforestation and timber stand improvement acreages certified as satisfactorily stocked by State and national forest--fiscal year 1993--  
Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation				Timber stand improvement				
	Artificial regeneration		Natural regeneration		Total Acres	Cleaning	Release	Thinning	Ferti- zation
	Planted	Seeded	w/site prep. 2/	w/o site prep. 2/					
West Virginia									
George Washington	56	0	137	0	193	0	201	0	0
Monongahela	0	0	729	651	1,380	0	625	0	0
Subtotal	56	0	866	651	1,573	0	826	0	0
Wisconsin									
Chequamegon	686	0	2,799	0	3,485	0	290	0	0
Nicolet	621	0	2,673	1,349	4,643	0	675	0	0
Subtotal	1,307	0	5,472	1,349	8,128	0	965	0	0
Wyoming									
Big Horn	0	0	130	165	295	0	0	0	0
Black Hills	0	0	0	0	0	0	0	271	0
Bridger-Teton	576	0	0	0	576	0	0	275	0
Medicine Bow	0	0	2,854	435	3,289	0	525	271	0
Shoshone	0	0	366	1,255	1,621	0	0	0	0
Targhee	291	0	799	0	1,090	0	0	0	0
Wasatch	0	0	0	130	130	0	0	0	0
Subtotal	867	0	4,149	1,985	7,001	0	525	817	0
Total	232,483	9,638	78,589	108,314	429,024	164	96,521	95,620	17,035
								4,475	213,815

1/ Unlisted States had no certification in fiscal year 1991.

2/ w/ site prep. = with site preparation; w/o site prep. = without site preparation.

Table 20—Certification of reforestation and timber stand improvement acreages by region--fiscal year 1993

Region	Reforestation				Timber stand improvement						
	Planted	Seeded	Natural regeneration		Total	Cleaning	Release	Precom- mercial thinning	Fertili- zation	Pruning	Total
			With site preparation	Without site preparation							
Acres											
Northern (R-1)	29,121	930	9,512	5,947	45,510	0	2,421	17,350	558	1,225	21,554
Rocky Mountain (R-2)	193	604	4,533	36,298	41,628	0	1,416	8,574	0	0	9,990
Southwest (R-3)	1,801	0	876	6,732	9,409	0	0	2,382	0	0	2,382
Intermountain (R-4)	11,136	0	3,748	5,383	20,267	4	446	10,728	0	0	11,178
Pacific Southwest (R-5)	30,193	0	210	1,135	31,538	0	52,827	16,495	1,176	371	70,869
Pacific Northwest (R-6)	89,958	94	7,580	12,430	110,062	160	5,527	26,151	13,422	2,147	47,407
Southern (R-8)	62,275	7,523	16,533	10,064	96,395	0	27,242	8,203	1,879	0	37,324
Eastern (R-9)	6,781	487	35,597	17,004	59,869	0	6,642	2,910	0	732	10,284
Alaska (R-10)	1,025	0	0	13,321	14,346	0	0	2,827	0	0	2,827
Total	232,483	9,638	78,589	108,314	429,024	164	96,521	95,620	17,035	4,475	213,815

Table 21—Timber stand improvement funding and accomplishments by funding source--fiscal years 1989-93

	Appropriated	Knutson-Vandenberg	Total
1989			
Million dollars 1/	36.2	39.6	75.8
1,000 acres	196.9 2/	146.1	343.0
Constant dollars/acre	183.8	271.0	221.0 3/
1990			
Million dollars 1/	32.2	32.8	65.0
1,000 acres	200.3 4/	166.6	366.9
Constant dollars/acre	160.8	196.9	177.2 3/
1991			
Million dollars 1/	33.3	24.4	57.7
1,000 acres	226.4	167.3	393.7 5/
Constant dollars/acre	147.1	146.1	146.6 3/
1992			
Million dollars 1/	32.3	25.7	58.0
1,000 acres	171.7	181.4	353.1 6/
Constant dollars/acre	188.9	141.6	164.3 3/
1993			
Million dollars 1/	27.5	23.9	51.4
1,000 acres	175.6	165.8	341.4 7/
Constant dollars/acre	156.6	144.2	150.6 3/

1/ All dollars are constant 1993. Does not include funds for nursery and tree improvement.

2/ Does not include 2,314 acres in Tongass Timber Supply fund.

3/ Weighted average.

4/ Includes 3,346 acres performed with carryover TSI funds.

5/ Does not include 2,127 acres accomplished with contributed funding.

6/ Does not include 1,746 acres accomplished with contributed funding.

7/ Does not include 2,565 acres accomplished with contributed funding.





Table 22—Timber stand improvement needs as of October 1, 1993, by State, national forest, and cubic foot productivity class

State, Commonwealth, or Territory 1/ National Forest	All timber stand improvement Cubic foot productivity classes 2/ Acres				Total	Release subtotal	Thinning subtotal	Ferti- lization subtotal	Pruning subtotal
	0-49	50-84	85-119	120+					
Alabama									
NFs in Alabama (subtotal)	295	3,570	3,101	619	7,585	7,510	75	0	0
Alaska									
Chugach	0	0	374	0	374	0	374	0	0
Tongass-Chatham	0	92	790	9,016	9,898	0	9,898	0	0
Tongass-Ketchikan	14	112	255	25,650	26,031	54	25,977	0	0
Tongass-Stikine	0	0	0	630	630	0	630	0	0
Subtotal	14	204	1,419	35,296	36,933	54	36,879	0	0
Arizona									
Apache-Sitgreaves	252	169	0	0	421	0	421	0	0
Coconino	5,809	530	0	0	6,339	0	6,339	0	0
Kaibab	1,790	294	0	0	2,084	0	2,084	0	0
Prescott	40	0	0	0	40	40	0	0	0
Tonto	114	0	0	0	114	43	71	0	0
Subtotal	8,005	993	0	0	8,998	83	8,915	0	0
Arkansas									
Ouachita	53	1,862	459	100	2,474	1,125	1,349	0	0
Ozark-St. Francis	598	9,675	1,178	70	11,521	6,747	4,774	0	0
Subtotal	651	11,537	1,637	170	13,995	7,872	6,123	0	0
California									
Angeles	106	663	328	0	1,097	780	231	0	86
Cleveland	0	707	0	0	707	511	195	0	1
Eldorado	70	578	8,670	16,615	25,933	18,113	7,762	58	0
Klamath	488	21,621	29,267	19,186	70,562	44,279	26,260	23	0
Lake Tahoe Basin	800	2,486	3,021	30	6,337	3,513	2,824	0	0
Lassen	2,009	43,047	16,897	2,753	64,706	28,972	35,734	0	0
Los Padres	0	53	0	0	53	12	41	0	0
Mendocino	55	18,022	17,098	37,796	72,971	43,559	25,888	3,524	0
Modoc	111	11,164	5,215	1,303	17,793	7,475	10,242	76	0

See footnotes at end of table.

Table 22--Timber stand Improvement needs as of October 1, 1993, by State, national forest, and cubic foot productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	All timber stand improvement Cubic foot productivity classes 2/ Acres				Total	Release subtotal	Thinning subtotal	Fertili- zation subtotal	Pruning subtotal
	0-49	50-84	85-119	120+					
California (continued)									
Plumas	59	3,780	19,657	9,755	33,251	9,665	23,586	0	0
Rogue River	0	1,490	0	0	1,490	1,406	84	0	0
San Bernardino	272	2,558	126	66	3,022	1,246	1,741	0	35
Sequoia	0	1,452	2,327	11,204	14,983	11,270	2,842	672	199
Shasta	0	580	1,277	6,984	8,841	8,222	619	0	0
Sierra	64	799	4,591	8,464	13,918	10,026	3,882	10	0
Siskiyou	0	0	296	0	296	134	0	162	0
Six Rivers	0	172	8,827	21,518	30,517	20,318	10,199	0	0
Stanislaus	179	4,861	11,648	50,001	66,689	47,001	19,688	0	0
Tahoe	114	4,478	26,478	33,360	64,430	32,117	31,937	376	0
Trinity	366	12,897	12,181	10,058	35,502	14,376	21,126	0	0
Subtotal	4,693	131,408	167,904	229,093	533,098	302,995	224,881	4,901	321
Colorado									
Arapaho-Roosevelt	1,711	0	0	0	1,711	301	1,410	0	0
Grand Mesa, Uncompahgre, and Gunnison	2,816	344	0	0	3,160	463	2,697	0	0
Manti-LaSal	0	90	95	0	185	0	185	0	0
Pike and San Isabel	2,105	385	0	0	2,490	1,894	596	0	0
Rio Grande	149	59	0	0	208	59	149	0	0
Routt	6,444	1,614	282	0	8,340	1,725	6,615	0	0
San Juan	1,835	1,123	49	0	3,007	2,779	228	0	0
White River	310	738	399	0	1,447	1,447	0	0	0
Subtotal	15,370	4,353	825	0	20,548	8,668	11,880	0	0
Florida									
NFs in Florida (subtotal)	1,184	801	422	41	2,448	996	392	1,060	0
Georgia									
Chattahoochee and Oconee (subtotal)	0	815	6,164	3,078	10,057	2,376	6,581	1,100	0

See footnotes at end of table.



Table 22--Timber stand improvement needs as of October 1, 1993, by State, national forest, and cubic foot productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	All timber stand improvement					Total	Release subtotal	Thinning subtotal	Fertili- zation subtotal	Pruning subtotal
	Cubic foot productivity classes 2/ Acres									
	0-49	50-84	85-119	120+						
Idaho										
Boise	735	1,528	8,797	703		11,763	1,517	10,246	0	0
Caribou	0	415	47	0		462	326	136	0	0
Challis	0	714	0	0		714	479	235	0	0
Clearwater	1,004	124	992	1,936		4,056	1,487	2,512	0	57
Idaho Panhandle	7,103	3,142	12,446	8,997		31,688	4,937	23,997	2,015	739
Kootenai	49	0	358	168		575	0	575	0	0
Nez Perce	179	664	1,757	562		3,162	427	2,735	0	0
Payette	501	1,658	3,498	459		6,116	1,142	4,974	0	0
Salmon	7,741	878	0	0		8,619	5,794	2,825	0	0
Sawtooth	396	24	0	0		420	152	268	0	0
Targhee	5	4,965	0	0		4,970	831	4,139	0	0
Subtotal	17,713	14,112	27,895	12,825		72,545	17,092	52,642	2,015	796
Illinois										
Shawnee (subtotal)	0	50	3	0		53	0	0	0	53
Indiana										
Hoosier (subtotal)	0	0	924	4,049		4,973	1,560	1,385	0	2,028
Kentucky										
Daniel Boone (subtotal)	3	899	4,678	485		6,065	598	5,413	0	51
Louisiana										
Kisatchie (subtotal)	3	647	1,689	1,739		4,078	3,043	1,035	0	0
Maine										
White Mountain (subtotal)	6	36	15	13		70	11	59	0	0
Michigan										
Hiawatha	2,566	9,908	1,048	42		13,564	5,050	2,085	0	6,429
Huron-Manistee	1,136	2,301	486	0		3,923	2,174	1,688	0	61
Ottawa	209	2,152	340	40		2,741	2,741	0	0	0
Subtotal	3,911	14,361	1,874	82		20,228	9,965	3,773	0	6,490

See footnotes at end of table.

Table 22--Timber stand improvement needs as of October 1, 1993, by State, national forest, and cubic foot productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	All timber stand improvement Cubic foot productivity classes 2/ Acres					Total	Release subtotal	Thinning subtotal	Fertili- zation subtotal	Pruning subtotal
	Cubic foot productivity classes 2/ Acres									
	0-49	50-84	85-119	120+						
Minnesota										
Chippewa	0	59	954	43	1,056	655	0	0	0	401
Superior	3,576	0	0	33	3,609	3,609	0	0	0	0
Subtotal	3,576	59	954	76	4,665	4,264	0	0	0	401
Mississippi										
NFs in Mississippi (subtotal)	88	564	577	3,322	4,551	2,616	1,634	301	0	0
Missouri										
Mark Twain (subtotal)	0	14,235	221	0	14,456	3,409	10,972	0	75	
Montana										
Beaverhead	3,989	3,135	1,207	76	8,407	27	8,380	0	0	0
Bitterroot	273	289	89	0	651	96	555	0	0	0
Custer	1,028	27	0	0	1,055	237	818	0	0	0
Deerlodge	5,723	1,608	948	125	8,404	42	8,362	0	0	0
Flathead	2,146	1,338	3,805	3,315	10,604	206	10,386	2	10	10
Gallatin	512	1,710	251	434	2,907	23	2,884	0	0	0
Helena	570	195	206	0	971	7	954	10	0	0
Idaho Panhandle	10	0	128	0	138	10	128	0	0	0
Kootenai	4,039	7,582	17,129	7,248	35,998	1,134	34,753	0	111	111
Lewis and Clark	1,507	1,042	608	0	3,157	0	3,157	0	0	0
Lolo	1,097	3,886	2,682	362	8,027	232	7,788	0	7	7
Subtotal	20,894	20,812	27,053	11,560	80,319	2,014	78,165	12	128	128
New Hampshire										
White Mountain (subtotal)	111	121	67	24	323	16	307	0	0	0
New Mexico										
Carson	1,395	437	30	0	1,862	307	1,555	0	0	0
Cibola	419	0	0	0	419	0	419	0	0	0
Gila	3,507	326	0	0	3,833	0	3,833	0	0	0

See footnotes at end of table.

Table 22—Timber stand improvement needs as of October 1, 1993, by State, national forest, and cubic foot productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	All timber stand improvement Cubic foot productivity classes 2/ Acres				Total	Release subtotal	Thinning subtotal	Fertili- zation subtotal	Pruning subtotal
	Cubic foot productivity classes 2/ Acres								
	0-49	50-84	85-119	120+					
New Mexico (continued)									
Lincoln	54	1,109	25	0	1,188	0	1,188	0	0
Santa Fe	2,155	260	0	0	2,415	450	1,965	0	0
Subtotal	7,530	2,132	55	0	9,717	757	8,960	0	0
New York									
Green Mountain (subtotal)	0	82	673	0	755	60	695	0	0
North Carolina									
NFs in North Carolina (subtotal)	777	2,929	955	3,307	7,968	5,169	1,847	952	0
Ohio									
Wayne (subtotal)	26	300	639	2,508	3,473	874	1,261	0	1,338
Oklahoma									
Ouachita (subtotal)	0	581	204	211	996	513	483	0	0
Oregon									
Deschutes	5,491	5,946	773	71	12,281	776	11,505	0	0
Fremont	10,957	6,498	1,478	4	18,937	2,167	16,770	0	0
Klamath	12	230	539	1,042	1,823	1,162	661	0	0
Malheur	8,158	15,430	0	0	23,588	537	23,051	0	0
Mt. Hood	504	25,596	19,595	4,033	49,728	618	24,637	19,157	5,316
Ochoco	8,110	4,808	12	0	12,930	170	11,288	0	1,472
Rogue River	0	9,897	21,596	545	32,038	17,028	7,726	5,744	1,540
Siskiyou	0	1,840	24,887	3,716	30,443	13,661	10,390	4,248	2,144
Siuslaw	0	0	0	10,457	10,457	3,875	5,843	633	106
Umatilla	1,635	2,724	158	513	5,030	148	4,784	72	26
Umpqua	0	6,450	21,251	7,711	35,412	3,442	17,291	12,958	1,721
Wallowa-Whitman	1,162	7,182	1,174	0	9,518	1,434	7,782	0	302
Willamette	28	3,212	30,301	50,294	83,835	11,908	18,197	40,349	13,381
Winema	19,147	16,146	371	311	35,975	438	35,304	0	233
Subtotal	55,204	105,959	122,135	78,697	361,995	57,364	195,229	83,161	26,241

See footnotes at end of table.



Table 22--Timber stand improvement needs as of October 1, 1993, by State, national forest, and cubic foot productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	All timber stand improvement Cubic foot productivity classes 2/ Acres					Total	Release subtotal	Thinning subtotal	Ferti- li- zation subtotal	Pruning subtotal
	Cubic foot productivity classes 2/ Acres									
	0-49	50-84	85-119	120+						
Puerto Rico Caribbean (subtotal)	0	300	798	0		1,098	498	600	0	0
South Carolina Francis Marion & Sumter (subtotal)	0	0	2,386	3,261		5,647	3,455	2,192	0	0
South Dakota Black Hills (subtotal)	8,863	759	0	0		9,622	231	9,391	0	0
Tennessee Cherokee (subtotal)	38	1,834	454	1,926		4,252	3,401	851	0	0
Texas NFs in Texas (subtotal)	0	650	2,113	1,324		4,087	3,766	321	0	0
Utah Ashley	3,382	0	0	0		3,382	0	3,382	0	0
Dixie	1,509	1,579	0	0		3,088	1,573	1,515	0	0
Fishlake	331	264	26	0		621	611	10	0	0
Manti-LaSal	0	0	1,331	200		1,531	0	1,531	0	0
Uinta	0	0	45	0		45	45	0	0	0
Wasatch-Cache	534	1,027	0	0		1,561	146	1,415	0	0
Subtotal	5,756	2,870	1,402	200		10,228	2,375	7,853	0	0
Vermont Green Mountain (subtotal)	907	1,465	109	0		2,481	1,223	1,258	0	0
Virginia George Washington	140	303	26	372		841	801	40	0	0
Jefferson	18	2,698	201	555		3,472	926	2,436	0	110
Subtotal	158	3,001	227	927		4,313	1,727	2,476	0	110
Washington Colville	909	4,377	2,841	489		8,616	1,605	7,011	0	0
Gifford Pinchot	0	17,087	24,082	6,694		47,863	398	25,002	13,230	9,233

See footnotes at end of table.

Table 22--Timber stand improvement needs as of October 1, 1993, by State, national forest, and cubic foot productivity class--Continued

State, Commonwealth, or Territory 1/	All timber stand improvement Cubic foot productivity classes 2/					Total	Release subtotal	Thinning subtotal	Fertili- zation subtotal	Pruning subtotal
	0-49	50-84	85-119	120+	Acres					
National Forest										
Washington (continued)										
Idaho Panhandle	130	0	373	205		708	112	596	0	0
Mt. Baker-Snoqualmie	0	120	3,809	2,381		6,310	178	4,350	1,488	294
Okanogan	3,515	3,091	849	0		7,455	1,919	4,702	0	834
Olympic	77	1,529	13,958	2,981		18,545	5	12,342	5,763	435
Umatilla	1,638	2,787	0	24		4,449	100	4,307	0	42
Wenatchee	37	18,333	3,630	891		22,891	4,692	13,551	3,263	1,385
Subtotal	6,306	47,324	49,542	13,665		116,837	9,009	71,861	23,744	12,223
West Virginia										
George Washington	0	192	0	138		330	330	0	0	0
Monongahela	99	257	789	553		1,698	1,074	624	0	0
Subtotal	99	449	789	691		2,028	1,404	624	0	0
Wisconsin										
Chequamegon	0	0	645	0		645	645	0	0	0
Nicolet	112	740	268	0		1,120	433	120	0	567
Subtotal	112	740	913	0		1,765	1,078	120	0	567
Wyoming										
Bighorn	12,172	375	0	0		12,547	1,412	11,135	0	0
Black Hills	813	197	0	0		1,010	0	1,010	0	0
Bridger-Teton	130	282	927	0		1,339	0	1,339	0	0
Medicine Bow	6,406	184	13	0		6,603	396	6,207	0	0
Shoshone	67	0	0	0		67	0	67	0	0
Wasatch	0	106	0	0		106	0	106	0	0
Subtotal	19,588	1,144	940	0		21,672	1,808	19,864	0	0
Total	181,881	392,096	431,756	409,189		1,414,922	469,854	776,997	117,246	50,822

1/ Unlisted States had no timber stand improvement needs as of October 1, 1993.

2/ Cubic foot productivity class refers to the cubic feet of wood produced per acre per year in a natural unmanaged stand.

Table 23—Timber stand improvement program needs--fiscal years 1993-95

	Work needs	Annual program, appropriated funds 1/	
		1,000 acres	Million dollars
10/1/92 balance	1,385		
Fiscal year 1993:			
New needs	400		
Accomplishments	-300	109.2	27.5
10/1/93 balance	1,485		
Fiscal year 1994:			
Projected new needs	400		
Projected accomplishments	-300		
Projected 10/1/94 balance	1,585		
Fiscal year 1995:			
Projected new needs	300		
Projected accomplishments	-274		
Projected 10/1/95 balance	1,465	2/	

1/ Includes Reforestation Trust Fund pursuant to P.L. 96-451, as amended.

2/ This represents over 5 years of future accomplishments.



Table 24—Timber offered, sold, and harvested--fiscal years 1989-93

	1993	1992	1991	1990	1989
Offered					
Volume (billion board feet)	4.6	5.1	6.2	11.1	10.5
Volume (billion cubic feet) 1/	(0.87)	(1.0)	(1.2)		
Sold					
Number of sales 2/	255,825	250,852	271,963	262,781	275,895
Volume (billion board feet)	4.5	4.4	6.4	9.3	8.4
Volume (billion cubic feet)	(0.85)	(0.86)	(1.2)		
Value (million dollars) 3/	774.9	576.2	801.2	1,609.9	1,077.5
Harvested					
Volume (billion board feet)	5.9	7.3	8.5	10.5	12.0
Volume (billion cubic feet)	(1.2)	(1.4)	(1.6)		
Value (million dollars) 4/	914.6	934.5	1,008.6	1,187.6	1,309.7

1/ Conversion from the 1990 RPA Program.

2/ These figures do not include nonconvertible product sales (see table 29 for number of nonconvertible product sales per year).

3/ This is the high bid value from all sales sold and includes stumpage, cost of reforestation, stand improvement costs, and timber salvage. Does not include value of roads or brush disposal.

4/ This is the current stumpage rate for the actual volume harvested and includes the reforestation and stand improvement costs and timber salvage. Does not include value of roads or brush disposal.

Table 25--Timber offered, sold, and harvested by region--fiscal years 1992-93

	1993			1992		
	Offered 1/	Sold 2/ 3/	Harvested 4/	Offered 1/	Sold 2/ 3/	Harvested 4/
<i>Million board feet</i>						
Northern (R-1)	381.5	381.2	617.2	509.3	592.6	807.6
Rocky Mountain (R-2)	260.0	252.0	261.2	338.5	270.1	345.1
Southwestern (R-3)	148.9	180.0	217.3	182.7	162.8	291.7
Intermountain (R-4)	403.3	343.3	359.5	317.2	315.5	366.3
Pacific Southwest (R-5)	768.8	739.2	721.5	784.0	574.0	1,150.8
Pacific Northwest (R-6)	629.6	786.9	1,666.2	683.9	740.5	2,140.1
Southern (R-8)	994.2	987.1	981.3	1,108.4	1,008.8	1,065.2
Eastern (R-9)	698.9	709.5	761.3	713.5	711.0	750.7
Alaska (R-10)	269.3	136.1	331.4	425.3	83.2	372.1
Total 5/	4,554.5	4,515.3	5,916.9	5,062.7	4,458.5	7,289.6

1/ Sales offered for the fiscal year being displayed.

2/ Includes sales offered in prior fiscal years and sold in the fiscal year being displayed and miscellaneous small sales that were previously offered and/or sold and were reoffered and sold in the fiscal year being displayed. Does not include the volume of long-term sales released for harvesting.

3/ Sold and offered will not be equal since some sales are not sold (awarded) in the same fiscal year in which they were offered. Some sales did not receive any bids, or were withdrawn.

4/ Includes the volume harvested on long-term sales.

5/ Columns may not add due to rounding.

Table 26—Timber sold and harvested by State—fiscal year 1993 1/

State or Commonwealth 2/	Timber sold			Timber harvested	
	Sales	Volume MBF 4/	Bid value 3/ Actual dollars	Volume MBF 4/	Receipts 3/ Actual dollars
Alabama	681	45,910.63	4,692,322.14	70,986.94	5,189,259.98
Alaska	124	136,088.58	4,422,314.17	331,352.69	5,462,995.15 5/
Arizona	16,388	119,408.12	21,338,668.36	137,044.89	16,281,829.04
Arkansas	2,335	191,077.21	22,090,418.16	131,213.76	12,556,230.46
California	52,359	739,662.32	172,427,868.49	725,846.90	142,594,001.03
Colorado	30,300	131,443.70	11,377,382.77	138,116.37	7,938,183.08
Florida	166	77,306.53	4,546,654.02	90,121.31	5,464,724.88
Georgia	1,286	49,248.04	3,936,234.30	54,446.28	4,439,644.18
Idaho	27,088	459,488.53	131,695,311.21	563,752.49	81,899,421.63
Illinois	81	15,211.53	426,566.84	4,130.47	93,729.28
Indiana	16	30.67	750.00	78.32	2,295.68
Kentucky	1,034	17,262.88	1,192,706.34	38,412.58	1,908,476.73
Louisiana	757	76,761.68	8,175,648.27	81,688.09	8,821,436.51
Maine	18	5,355.00	223,906.34	245.80	15,766.30
Michigan	768	227,714.68	8,997,886.35	216,418.61	6,441,084.54
Minnesota	305	167,517.90	5,130,364.07	199,295.01	4,815,409.46
Mississippi	905	176,589.07	22,187,237.85	204,459.35	21,653,066.64
Missouri	1,447	63,157.46	4,659,055.43	55,583.66	3,213,494.10
Montana	15,628	189,332.25	44,197,809.80	331,049.98	48,416,265.26
Nebraska	7	34.50	105.00	7.50	75.00
Nevada	1,771	2,172.60	42,319.36	2,390.30	44,728.12
New Hampshire	194	21,729.87	1,138,373.87	27,597.00	1,068,364.17
New Mexico	15,467	60,545.52	1,056,408.79	80,388.54	2,619,913.43
New York	7	9.50	190.00	13.50	270.00
North Carolina	1,680	57,605.44	3,248,168.77	50,675.19	2,007,153.55
North Dakota	77	101.50	1,015.00	101.50	1,015.00
Ohio	88	138.60	2,111.46	2,070.15	95,725.63
Oklahoma	65	38,129.73	4,554,695.57	21,480.43	1,648,254.35
Oregon	37,477	657,975.23	178,540,275.40	1,281,538.89	391,992,226.95
Pennsylvania	111	53,845.96	20,769,737.68	70,401.30	16,621,021.17
South Carolina	234	66,279.95	6,965,629.22	65,951.86	5,650,337.58
South Dakota	2,435	85,899.12	20,975,875.03	73,774.91	12,509,869.82
Tennessee	724	22,299.23	1,307,974.93	29,445.18	1,443,334.00
Texas	871	102,162.67	16,904,033.15	81,917.28	11,284,732.71
Utah	10,523	52,965.13	5,377,506.37	54,326.45	2,950,295.95
Vermont	86	2,561.66	292,192.40	7,717.11	384,202.29
Virginia	3,305	61,217.30	3,973,232.84	56,244.35	1,999,480.76
Washington	10,942	129,223.47	19,387,723.30	386,100.89	73,168,082.05
West Virginia	605	32,948.80	7,263,455.07	37,777.50	3,686,130.63
Wisconsin	267	124,574.35	4,991,877.89	144,283.07	3,456,753.40
Wyoming	17,203	54,336.97	6,375,920.52	68,491.21	4,806,772.49
Total 6/	255,825	4,515,323.88	774,887,926.53	5,916,937.61	914,646,052.98

1/ Excludes nonconvertible products such as Christmas trees, cones, burls, etc.

2/ States not listed had no timber sold or harvested in fiscal year 1993.

3/ Includes Knutson-Vandenberg and salvage sale receipts. Does not include brush disposal and road costs.

4/ MBF = thousand board feet.

5/ The result of refunds for overpayments due to a rate redetermination for the period of 1989 to 1991 on a long-term contract.

6/ Columns may not add due to rounding.



Table 27--Number of sales, volume, and value of timber sold on National Forest System lands by size class--fiscal years 1989-93

		Sale size class					15,001 MBF and over	Noncon- vertibles	Total less non- convertibles
		To 1/ \$300	\$301- 2/ \$2,000	\$2,000- 3/ 2,000 MBF4/	2,001 MBF- 5,000 MBF	5,000 MBF- 15,000 MBF			
1989									
	Number of sales	253,542	18,392	2,849	615	462	35	250,081	275,895
	Volume (MBF)	555,149	276,650	1,612,985	1,947,180	3,510,835	511,786	0	8,414,585
	Value (\$1,000)	4,244	6,830	130,713	225,523	629,542	80,683	2,864	1,077,534
1990									
	Number of sales	247,078	11,258	3,274	645	503	23	253,981	262,781
	Volume (MBF)	491,767	239,889	1,799,519	2,154,272	4,137,737	426,510	0	9,249,694
	Value (\$1,000)	4,190	6,841	179,729	361,163	980,264	77,737	2,882	1,609,924
1991									
	Number of sales	255,653	12,451	2,976	524	325	34	239,165	271,963
	Volume (MBF)	461,276	237,284	1,473,391	1,599,520	2,319,924	303,057	0	6,394,452
	Value (\$1,000)	4,455	4,926	122,843	194,426	433,999	40,588	2,747	801,237
1992									
	Number of sales	231,038	15,840	3,361	448	162	3	218,851	250,852
	Volume (MBF)	410,377	195,702	1,448,513	1,288,949	1,033,838	81,073	0	4,458,452
	Value (\$1,000)	4,058	5,170	160,044	207,443	190,718	6,382	2,423	573,815
1993									
	Number of sales	229,759	20,895	4,637	394	123	17	220,962	255,825
	Volume (MBF)	469,537	168,865	1,447,127	1,170,276	955,561	303,958	0	4,515,324
	Value (\$1,000)	3,918.3	5,097.4	189,645.9	215,229.4	278,137.4	82,859.5	2,791.4	774,887.9

1/ Sales up to \$300 per sale.

2/ Sales ranging from \$300 to \$2,000 per sale.

3/ Sales valued at more than \$2,000 but less than 2,000 MBF in volume.

4/ MBF = thousand board feet.

5/ Nonconvertible products include Christmas trees, cones, burls, etc.

Table 28—Uncut timber volume under contract by region--fiscal years 1989-93

Region	1993		1992		1991	1990		1989
	MMBFI/	MMCF 2/	MMBFI/	MMCF 2/		Million board feet		
Northern (R-1)	1,086	266	1,319	322	1,599	1,839	2,210	
Rocky Mountain (R-2)	526	120	683	157	763	908	912	
Southwestern (R-3)	148	25	199	33	334	434	606	
Intermountain (R-4)	483	99	503	102	550	639	612	
Pacific Southwest (R-5)	907	141	964	150	1,411	2,240	2,650	
Pacific Northwest (R-6)	2,218	435	3,358	658	4,909	8,029	7,112	
Southern (R-8)	1,253	234	1,251	233	1,308	1,354	1,673	
Eastern (R-9)	1,665	269	1,706	277	1,746	1,712	1,732	
Alaska (R-10)	77	20	95	24	185	269	377	
Total	8,363	1,609	10,078	1,956	12,805	17,424	17,884	

1/ Volume in local scale. Long-term sales not included. Long-term sales volume under contract at the end of fiscal year 1993 was 4,483 million board feet.

2/ Million cubic feet conversions based on 1990 RPA Program.

Table 29—Timber sale funding--fiscal years 1991-93

	1993	1992	1991
	<i>1,000 dollars</i>		
National Forest System			
Timber management.....	150,881	188,604	197,403
Harvest administration.....	68,152	75,141	65,730
Subtotal	219,033	263,745	263,133
Support to timber sales program			
Minerals.....	1,127	1,606	1,428
Forest fire protection.....	3,177	4,376	3,651
Recreation.....	12,179	15,827	12,102
Wildlife and fish.....	16,445	15,920	10,942
Range.....	862	1,243	1,151
Soil and water.....	7,929	9,804	7,538
Landline location.....	13,210	1/	19,851
Subtotal	54,929	48,776	56,663
Road construction			
Forest Service construction.....	86,259	117,574	119,088
Purchaser construction.....	(110,669)	(113,000)	(110,000)
Purchaser construction by the Forest Service.....	8,546	5,806	4,859
Subtotal	94,805	123,380	123,947
Total, appropriated accounts	368,767	435,901	443,743
Special accounts 2/			
Timber salvage sales.....	193,747	120,358	117,620
Subtotal	193,747	120,358	117,620
Total	562,514	556,259	561,363

1/ All landline funds were spent in support of the stewardship program and resolving trespass cases.

2/ Includes General Administration expenses.



Table 30--Range allotment management status by region--fiscal year 1993

Region	Total number of allotments	Number of allotments being managed to achieve forest plan objectives
Northern (R-1)	1,666	613
Rocky Mountain (R-2)	2,343	1,677
Southwestern (R-3)	1,415	883
Intermountain (R-4)	1,722	1,238
Pacific Southwest 1/ (R-5)	760	358
Pacific Northwest (R-6)	738	362
Southern (R-8)	535	492
Eastern (R-9)	164	135
Total	9,343	5,758

1/ 1993 data not available - used 1992 data

Table 31—Authorized grazing use in HM's by State—fiscal year 1993 1/

State, Commonwealth, or Territory 2/	Cattle	Sheep	Domestic horses	Wild horses	Wild burros	Total
Alabama	2,045	0	80	0	0	2,125
Arizona	711,528	75,357	5,142	0	264	792,291
Arkansas	18,986	0	10	0	0	18,996
California	268,697	67,687	5,536	4,842	720	347,482
Colorado	639,698	458,927	7,754	0	0	1,106,379
Florida	14,639	0	0	0	0	14,639
Georgia	4,342	0	0	17	0	4,359
Idaho	427,846	578,472	10,433	0	0	1,016,751
Illinois	18,539	2,815	48	0	0	21,402
Kansas	32,568	0	0	0	0	32,568
Kentucky	71	0	0	0	0	71
Louisiana	8,597	0	0	0	0	8,597
Michigan	1,346	0	0	0	0	1,346
Minnesota	194	0	0	0	0	194
Mississippi	84	0	0	0	0	84
Missouri	23,308	0	0	0	0	23,308
Montana	453,633	63,213	16,234	350	0	533,430
Nebraska	95,323	0	8	0	0	95,331
Nevada	141,854	147,537	243	12,384	0	302,018
New Mexico	649,942	91,136	5,761	2,570	0	749,409
New York	7,904	0	264	0	0	8,168
North Dakota	378,086	0	3,149	0	0	381,235
Ohio	977	0	6	0	0	983
Oklahoma	17,728	0	0	0	0	17,728
Oregon	317,490	117,278	587	3,000	0	438,355
South Dakota	340,039	23,835	130	0	0	364,004
Texas	48,494	0	0	0	0	48,494
Utah	339,848	638,252	1,498	0	0	979,598
Vermont	188	0	0	0	0	188
Virginia	6,374	0	1,309	0	0	7,683
Washington	74,332	49,328	18	0	0	123,678
West Virginia	5,517	630	18	0	0	6,165
Wyoming	450,635	474,653	9,318	0	0	934,606
Total	5,500,852	2,789,120	67,546	23,163	984	8,381,665

1/ A head month (HM) is the billing unit for permitted grazing and is equal to 1 month's occupancy.

2/ Unlisted States had no Forest Service grazing program in 1993.

Table 32--Annual grazing statistics--fiscal year 1993

	Permittees		Cattle		Horses and burros		Sheep and goats		Total	
			Number	HM's 1/	Number	HM's	Number	HM's	Number	HM's
Permitted to graze			1,273,861	6,307,191	44,023	68,324	1,111,103	3,406,153	2,428,987	9,781,668
Authorized to graze: Paid permits 2/	9,113		1,152,836	5,481,360	10,478	37,866	948,205	2,759,715	2,111,519	8,278,941
Free use:										
Recreation stock	4,262				33,107	23,899	5	5	33,112	23,904
Other free use	47		3,882	19,258	554	5,634	2,673	21,426	7,109	46,318
Private land permits 3/	134		39,252	300,132	382	4,781	11,837	41,459	51,471	346,372
Crossing	7		1,055	234	206	147	8,914	7,974	10,175	8,355
Total Authorized 3/	13,429		1,157,773	5,500,852	44,345	67,546	959,797	2,789,120	2,161,915	8,357,518
Wild horses					2,028	23,163			2,028	23,163
Wild burros					82	984			82	984
Authorized and wild horse & burro 3/	13,429		1,157,773	5,500,852	46,455	91,693	959,797	2,789,120	2,164,025	8,381,665

1/ A head month (HM) is the billing unit for permitted grazing and is equal to 1 month's occupancy.

2/ Includes term and temporary grazing permits and all other paid permits (e.g., transportation, research, working animals, special uses, etc.).

3/ Private land permit data not included in totals.





Table 33—Status of NFS acres within grazing allotments with range vegetation management objectives—fiscal year 1993

Region	Acres with range vegetation management objectives	Acres meeting or moving toward FP objectives 1/	Acres not meeting or moving toward FP objectives 1/	Acres of undetermined status	Acres monitored in FY 1993
Northern (R-1)	5,199,805	1,786,045	3,413,760	0	519,162
Rocky Mountain (R-2)	11,854,636	8,104,088	849,739	2,900,809	2,816,463
Southwest (R-3)	18,406,531	11,618,387	4,799,263	1,988,881	5,137,999
Intermountain (R-4)	19,729,273	15,240,075	1,128,924	3,360,274	6,985,842
Pacific Southwest 2/ (R-5)	6,608,129	2,610,423	146,845	3,850,861	1,772,415
Pacific Northwest (R-6)	10,424,470	6,406,614	533,128	3,484,728	3,275,221
Southern (R-8)	1,985,463	1,675,833	58,429	251,201	393,202
Eastern (R-9)	65,668	60,506	2,205	2,957	58,088
Total	74,273,975	47,501,971	10,932,293	15,839,711	20,958,392

See footnotes at end of table.

Table 33—Status of NFS acres within grazing allotments with range vegetation management objectives--fiscal year 1993--  
Continued

Total riparian acres	Riparian acres meeting or moving toward FP objectives 1/	Riparian acres not meeting or moving toward FP objectives 1/	Riparian acres of undetermined status	Riparian acres monitored in FY 1993	Region
161,733	64,559	97,174	0	16,256	Northern (R-1)
501,881	279,608	43,624	178,649	108,985	Rocky Mountain (R-2)
310,117	187,673	92,245	30,199	78,316	Southwest (R-3)
640,070	503,916	72,039	64,115	188,412	Intermountain (R-4)
291,900	143,510	14,084	134,306	69,764	Pacific Southwest 2/ (R-5)
441,340	243,914	64,479	132,947	136,405	Pacific Northwest (R-6)
88,845	49,534	6,312	32,999	6,573	Southern (R-8)
1,661	1,102	287	272	1,065	Eastern (R-9)
2,437,547	1,473,816	390,244	573,487	605,776	Total

1/ FP = forest plan.

2/ 1993 data not available - used 1992 data



Table 34--Energy mineral workload and production--fiscal years 1989-93

Fiscal year	Acres under lease	Oil production 1/	Gas production 1/	Coal production 1/
	<i>Millions</i>	<i>Barrels</i>	<i>1,000 cu.ft.</i>	<i>Short tons</i>
1989	14.2	12,100,000	204,000,000	65,500,000
1990	12.0	11,800,000	210,000,000	75,000,000
1991	12.0	11,550,000	201,000,000	85,600,000
1992	9.0	11,000,000	210,000,000	85,000,000
1993	9.6	10,500,000	210,000,000	90,000,000

1/ Estimates.



See footnotes at end of table.

State or Commonwealth	Cost					Miles fully maintained 1/					Miles lacking full maintenance 2/				
	Level 1		Level 2		Levels 3,4,5 Passenger Car 5/	Level 1		Level 2		Levels 3,4,5 Passenger Car 5/	Level 1		Level 2		Levels 3,4,5 Passenger Car 5/
	Closed 3/	High	Clearance 4/	High		Closed 3/	High	Clearance 4/	High		Closed 3/	High	Clearance 4/	High	
	1,000 dollars														
Alabama	16.2	40.1	600.9			107.8	464.4	479.9	161.6	199.1	205.7				1,618.5
Alaska 7/	112.3	250.8	742.1			588.4	1,081.4	620.0	441.0	441.0	327.0				3,498.8
Arizona	289.4	803.8	1,780.3			456.4	7,655.5	2,153.5	1,636.0	16,491.0	866.0				29,258.4
Arkansas	20.1	134.2	987.8			1,507.0	2,796.0	532.6	1,113.0	2,775.0	942.0				9,665.6
California	453.3	4,445.9	11,790.1			2,576.2	7,606.4	7,572.3	4,321.5	17,699.2	5,300.1				45,075.7
Colorado	349.0	1,127.3	2,173.6			675.1	2,281.8	2,844.8	2,250.7	6,417.3	2,301.6				16,771.3
Florida	0.1	15.3	517.1			0.0	40.0	200.0	10.6	3,100.2	1,045.4				4,396.2
Georgia	61.1	156.9	744.1			37.7	190.7	110.6	75.3	500.1	572.0				1,486.4
Idaho	466.4	1,134.7	3,894.6			3,349.5	5,358.0	6,483.7	4,357.0	8,752.4	5,192.0				33,492.6
Illinois	87.1	135.6	350.4			187.3	219.0	91.7	224.3	319.5	84.2				1,126.0
Indiana	0.0	0.0	51.0			35.0	0.0	30.0	0.0	0.0	10.0				75.0
Kansas	0.0	6.6	3.0			0.5	79.5	61.9	0.0	10.0	5.7				157.6
Kentucky	2.0	25.5	538.4			260.0	256.0	340.0	22.0	211.0	132.6				1,221.6
Louisiana	6.8	94.8	486.2			182.9	1,342.0	367.3	9.6	447.3	378.6				2,727.7
Maine	2.1	4.2	35.3			0.0	0.0	0.0	33.5	10.1	35.5				79.1
Michigan	24.9	168.7	951.5			1,245.0	713.0	755.3	2,859.5	4,263.2	648.0				10,484.0
Minnesota	108.3	185.2	1,186.5			761.4	163.0	894.4	640.3	1,492.7	473.4				4,425.2
Mississippi	11.5	100.9	245.5			292.0	464.2	454.5	302.0	728.8	369.3				2,610.8
Missouri	23.6	99.4	308.3			0.0	639.0	595.3	92.6	1,353.3	146.0				2,826.2
Montana	337.8	745.1	3,451.2			3,490.0	4,278.0	4,922.0	3,792.0	9,336.0	5,648.0				31,466.0
Nebraska	1.2	54.8	136.4			11.2	105.0	91.0	0.0	147.9	23.5				378.6
Nevada	36.0	185.0	495.4			2.0	633.0	579.0	276.0	2,814.0	740.0				5,044.0
New Hampshire	14.8	29.6	251.4			0.0	0.0	0.0	153.1	94.9	162.4				410.4
New Mexico	312.8	1,268.8	1,342.2			1,358.6	1,394.9	1,288.5	3,115.0	12,845.0	1,388.0				21,390.0
New York	0.0	0.0	0.5			0.0	0.0	0.0	2.5	0.2	1.4				4.1
North Carolina	6.0	68.5	449.7			30.0	450.0	590.0	89.8	683.6	318.5				2,161.9
North Dakota	20.1	8.0	40.6			0.0	316.0	183.0	2.0	4.0	61.0				566.0
Ohio	0.0	0.0	48.3			43.0	0.0	22.0	0.0	0.0	3.0				68.0
Oklahoma	0.6	4.4	64.4			49.0	228.0	61.0	0.0	265.0	127.0				730.0
Oregon	1,364.0	3,180.0	9,783.0			6,738.0	19,498.0	7,094.0	7,752.0	21,973.0	4,591.0				67,646.0
Pennsylvania	23.1	209.2	170.4			34.3	466.6	370.7	29.2	109.4	98.6				1,108.8
Puerto Rico	0.0	24.0	40.9			0.0	0.0	0.0	1.5	4.9	16.9				23.3



Table 35—Road maintenance accomplishments by State--fiscal year 1993--Continued

State or Commonwealth	Cost				Miles fully maintained 1/				Miles lacking full maintenance 2/			
	Level 1		Level 2		Level 1		Level 2		Level 1		Level 2	
	Closed 3/	Passenger Car 5/	High Clearance 4/	Passenger Car 5/	Closed 3/	Passenger Car 5/	High Clearance 4/	Passenger Car 5/	Closed 3/	High Clearance 4/	Passenger Car 5/	Passenger Car 5/
	1,000 dollars				Miles				Miles			
South Carolina	60.0		68.0	470.0	0.0	0.0	0.0	0.0	504.7	107.0	1,035.8	1,647.5
South Dakota	136.4		221.0	473.9	66.3	687.2	894.2	687.2	243.5	2,660.5	31.5	4,583.2
Tennessee	20.0		47.8	447.4	100.0	180.0	150.0	180.0	68.0	656.0	344.9	1,498.9
Texas	36.0		146.0	313.3	264.0	177.0	423.0	177.0	187.0	1,171.0	288.6	2,510.6
Utah	117.8		509.5	1,918.8	138.1	2,245.9	2,393.9	2,245.9	384.1	6,118.3	590.7	11,871.0
Vermont	22.2		68.7	167.2	0.0	0.0	0.0	0.0	61.1	91.8	81.6	234.5
Virginia	29.4		220.1	816.1	98.0	233.0	452.0	233.0	276.2	883.5	795.8	2,738.5
Washington	547.6		2,002.9	5,651.5	1,747.0	2,605.0	3,758.0	2,605.0	2,942.0	8,125.0	2,926.0	22,103.0
West Virginia	14.0		46.2	1,072.6	207.9	595.4	562.4	595.4	62.0	137.0	98.5	1,663.2
Wisconsin	71.7		149.3	1,637.5	494.0	1,660.0	2,108.0	1,660.0	151.0	1,762.0	1,318.0	7,493.0
Wyoming	177.9		294.6	1,441.3	938.6	1,743.0	4,617.9	1,743.0	879.6	1,911.3	957.2	11,047.6
Total 7/	5,383.6		18,481.4	58,070.7	28,072.2	49,915.5	74,078.8	49,915.5	39,522.8	137,112.5	40,683.0	369,384.8

1/ Includes miles of road maintained at a level consistent with current uses.

2/ Includes miles of road maintained at a level less than adequate for current uses.

3/ Roads closed to motorized traffic.

4/ Roads maintained for use by high clearance vehicles.

5/ Roads maintained for passenger car use.

6/ Road mile changes include roads acquired through land and right-of-way purchases, inventory revisions and new construction.

7/ Does not include \$1,172,590 of Washington Office and National Commitment funds.

Table 36—Road and bridge construction and reconstruction by State--fiscal year 1993

State or Commonwealth 2/	From Appropriated Funds 1/							
	Construction				Reconstruction			
	Roads		Bridges		Roads		Bridges	
	Miles	Cost	No.	Cost	Miles	Cost	No.	Cost
		1,000 dollars		1,000 dollars		1,000 dollars		1,000 dollars
Alabama	0.2	268.7	0	0.0	0.0	501.1	0	0.0
Alaska 4/	5.3	11,271.0	4	615.3	32.6	3,460.3	11	1,478.3
Arizona	2.3	2,548.6	0	0.0	4.8	3,092.9	0	0.0
Arkansas	0.2	798.3	0	35.2	2.0	1,376.4	0	0.0
California	2.2	4,142.7	0	0.0	14.2	6,151.7	1	34.2
Colorado	1.4	1,919.6	1	77.7	33.9	7,787.2	0	6.4
Florida	0.0	0.0	0	0.0	3.9	721.5	0	0.0
Georgia	0.7	802.2	1	182.9	13.4	2,353.3	0	0.0
Idaho	0.0	3,360.5	0	0.0	38.3	4,942.0	2	197.8
Illinois	0.0	0.0	0	0.0	1.0	528.6	0	137.8
Indiana	0.1	14.8	0	0.0	0.8	255.2	0	0.0
Kansas	0.0	0.5	0	0.0	2.0	48.5	0	0.0
Kentucky	0.1	260.4	0	0.0	0.8	586.0	0	0.9
Louisiana	0.2	39.7	0	0.0	0.0	797.1	0	0.0
Maine	0.3	94.3	0	0.0	0.1	19.4	1	26.5
Michigan	0.1	416.1	0	0.0	23.5	2,533.8	0	0.0
Minnesota	0.1	111.2	0	0.0	4.3	1,804.4	0	0.0
Mississippi	0.0	107.8	0	0.0	1.4	1,021.8	0	127.2
Missouri	0.0	0.0	0	0.0	3.0	723.8	0	36.2
Montana	4.9	4,014.1	3	195.6	31.4	6,089.0	3	129.4
Nebraska	0.0	0.0	0	0.0	0.0	65.7	0	0.0
Nevada	0.5	72.6	0	0.0	7.9	456.0	0	0.0
New Hampshire	0.5	129.2	0	0.0	3.8	416.2	0	0.0
New Mexico	3.0	1,582.2	0	0.0	40.5	4,656.6	0	0.0
New York	0.0	0.0	0	0.0	0.0	0.0	0	0.0
North Carolina	0.0	485.3	0	5.8	2.5	941.2	0	7.0
Ohio	0.1	135.2	0	0.0	0.0	0.0	0	0.0
Oklahoma	0.0	0.0	0	0.0	0.1	66.8	0	0.0
Oregon	2.6	8,498.8	0	0.0	20.2	10,387.6	1	199.3
Pennsylvania	0.1	258.0	0	0.0	1.9	685.2	1	48.8
Puerto Rico	0.0	28.8	0	0.0	0.0	21.4	0	0.0
South Carolina	0.7	159.3	0	0.0	8.1	610.8	0	0.0
South Dakota	0.0	150.5	0	0.0	5.4	1,493.1	0	0.0
Tennessee	0.0	409.1	1	20.0	0.2	357.2	0	0.0
Texas	2.6	990.1	0	0.0	2.6	851.2	0	0.0
Utah	0.5	1,884.1	1	4.0	17.0	3,307.7	2	75.9
Vermont	2.4	149.5	0	0.0	0.0	145.9	0	26.8
Virginia	4.4	885.7	0	1.0	3.8	825.7	6	43.6
Washington	0.5	4,913.8	0	1.5	1.2	4,108.2	1	397.5
West Virginia	4.9	949.3	1	191.7	3.2	248.3	0	0.0
Wisconsin	1.8	711.3	0	0.0	28.0	2,738.2	0	39.1
Wyoming	1.7	920.3	1	44.8	12.8	1,048.5	0	0.0
Total	44.4	53,483.6	13	1,375.5	370.6	78,225.5	29	3,012.7

See footnotes at end of table.

Table 36--Road and bridge construction and reconstruction by State--fiscal year 1993--Continued

By Timber Purchasers								
Construction				Reconstruction				State or Commonwealth 2/
Roads		Bridges		Roads		Bridges		
Miles 3/	Cost	No.	Cost	Miles 3/	Cost	No.	Cost	
1,000 dollars		1,000 dollars		1,000 dollars		1,000 dollars		
2.4	73.8	0	0.0	2.3	29.4	0	0.0	Alabama
94.7	14,833.8	18	781.7	49.0	1,066.7	14	892.9	Alaska 4/
0.5	9.4	0	0.0	194.6	1,478.9	0	0.0	Arizona
31.3	384.9	0	0.0	90.5	1,208.1	0	0.0	Arkansas
59.5	1,883.8	0	0.0	308.1	6,047.9	0	0.0	California
57.4	997.0	0	0.0	55.4	579.0	0	0.0	Colorado
0.0	0.0	0	0.0	12.6	136.9	0	0.0	Florida
4.1	97.0	0	0.0	11.4	75.9	0	0.0	Georgia
143.1	4,663.9	0	0.0	309.8	3,359.1	1	47.6	Idaho
0.0	0.0	0	0.0	3.6	29.3	0	0.0	Illinois
0.0	0.0	0	0.0	0.0	0.0	0	0.0	Indiana
0.0	0.0	0	0.0	0.0	0.0	0	0.0	Kansas
7.3	79.7	0	0.0	10.5	94.1	0	0.0	Kentucky
2.6	28.8	0	0.0	81.4	890.5	0	0.0	Louisiana
1.2	51.5	0	0.0	1.3	13.7	0	0.0	Maine
27.1	169.8	0	0.0	61.0	389.6	0	0.0	Michigan
6.2	164.6	0	0.0	6.0	13.4	0	0.0	Minnesota
5.0	139.4	0	0.0	102.7	1,412.8	2	115.0	Mississippi
0.0	0.0	0	0.0	40.1	206.2	0	0.0	Missouri
61.9	2,155.1	0	0.0	100.7	1,201.8	0	0.0	Montana
0.0	0.0	0	0.0	0.0	0.0	0	0.0	Nebraska
0.0	0.0	0	0.0	0.0	0.0	0	0.0	Nevada
2.4	51.8	1	44.0	5.7	73.1	0	0.0	New Hampshire
19.3	313.1	0	0.0	10.6	114.5	0	0.0	New Mexico
0.0	0.0	0	0.0	0.0	0.0	0	0.0	New York
15.6	659.5	0	0.0	74.8	563.5	0	0.0	North Carolina
0.0	0.0	0	0.0	0.0	0.0	0	0.0	Ohio
2.6	31.2	0	0.0	0.0	0.0	0	0.0	Oklahoma
48.2	1,285.8	0	0.0	197.8	3,162.1	0	0.0	Oregon
8.4	94.3	0	0.0	58.5	140.6	0	0.0	Pennsylvania
0.0	0.0	0	0.0	0.0	0.0	0	0.0	Puerto Rico
2.3	100.9	0	0.0	51.5	310.8	0	0.0	South Carolina
23.1	308.3	0	0.0	76.3	777.7	0	0.0	South Dakota
9.6	56.1	0	0.0	9.6	162.8	0	0.0	Tennessee
2.9	45.4	0	0.0	59.4	863.1	0	0.0	Texas
31.3	240.4	0	0.0	49.8	465.8	0	0.0	Utah
0.0	0.7	0	0.0	0.4	6.7	0	0.0	Vermont
7.7	145.3	0	0.0	13.4	144.6	0	0.0	Virginia
39.6	1,291.0	0	0.0	46.5	453.3	0	0.0	Washington
11.6	453.8	0	0.0	11.9	201.5	0	0.0	West Virginia
6.3	53.6	0	0.0	43.0	241.7	0	0.0	Wisconsin
11.3	133.0	0	0.0	25.1	334.7	0	0.0	Wyoming
746.5	30,996.7	19	825.7	2,175.4	26,249.8	17	1,055.5	Total

1/ Includes funds for engineering and program support for appropriated roads and timber purchaser roads. Does not include \$7,612,177.87 of Washington Office funds and \$2,447,400 transferred to the Federal Highway Administration (FHWA). The FHWA funds provided for A&E planning and design for future year projects.

2/ States not listed had no Forest Service road programs in 1993.

3/ Does not include 25.4 miles of construction and 79.3 miles of reconstruction turned back to the Forest Service (Purchaser Election Program).

4/ Includes Tongass Timber Supply Fund, \$382,800,0.3 miles construction and 8 bridges.



Table 37—Purchaser election roads constructed by the Forest Service by State--fiscal year 1993

State or Commonwealth 1/	Construction Roads		Reconstruction Roads	
	Miles	Cost	Miles	Cost
		1,000 dollars		1,000 dollars
Alabama	0.0	0.0	3.5	53.8
Arkansas	1.0	40.6	0.4	7.6
California	6.4	429.5	3.7	105.1
Colorado	2.8	173.3	0.0	0.0
Florida	0.0	0.0	1.9	45.0
Georgia	0.0	58.5	0.0	63.6
Idaho	6.5	170.7	46.9	613.8
Louisiana	0.5	16.3	2.3	54.1
Mississippi	1.4	143.5	2.6	103.1
Montana	0.5	72.5	17.9	164.8
New Hampshire	0.5	18.1	0.1	1.3
Oregon	0.0	19.5	0.0	65.7
Pennsylvania	0.0	-4.1	0.0	5.8
Tennessee	2.8	54.6	0.0	3.3
Vermont	0.0	5.9	0.0	8.4
Washington	3.0	201.7	0.0	0.0
West Virginia	0.0	17.8	0.0	0.0
Total 2/	25.4	1,418.4	79.3	1,295.4

1/ Unlisted states had no timber purchaser roads constructed by the Forest Service in FY 1993.

2/ Does not include General Administrative expenses.

Table 38—Payment to States from national forest receipts—fiscal years 1991-1993 1/

State, Commonwealth, or Territory 1/	FY 1993	FY 1992	FY 1991
	<i>dollars actual</i>		
Alabama	1,390,707.02	1,881,981.22	1,436,320.32
Alaska	3,901,912.71	3,345,950.44	9,298,893.27
Arizona	5,658,379.07	6,125,695.16	5,002,305.90
Arkansas	3,450,850.85	2,141,293.04	4,367,211.62
California	47,060,152.68	59,580,922.17	56,045,154.14
Colorado	5,541,927.06	4,538,913.53	4,105,051.79
Florida	1,570,634.99	1,503,569.12	1,257,369.74
Georgia	1,240,412.85	1,225,869.10	1,082,671.63
Idaho	22,966,972.68	19,427,079.28	14,106,370.90
Illinois	46,807.23	40,784.24	56,985.60
Indiana	12,177.50	11,859.68	25,063.01
Kentucky	683,085.08	646,572.27	635,218.59
Louisiana	2,417,348.58	3,888,688.27	2,812,497.08
Maine	40,248.27	30,982.64	35,338.34
Michigan	1,897,568.10	1,906,690.24	1,701,021.71
Minnesota	2,667,734.07	2,455,163.33	2,062,037.88
Mississippi	5,930,285.85	6,147,256.79	6,089,594.69
Missouri	871,200.97	1,366,714.82	1,999,913.90
Montana	13,854,903.49	11,839,490.13	9,009,450.17
Nebraska	39,329.54	44,574.57	41,358.39
Nevada	356,128.64	425,283.05	351,943.70
New Hampshire	589,502.13	454,605.69	517,515.64
New Mexico	1,642,149.35	2,007,276.46	1,363,545.50
New York	2,276.34	1,755.19	8,843.56
North Carolina	786,977.55	722,720.12	614,521.17
North Dakota	79.01	91.53	68.05
Ohio	37,692.65	132,986.34	150,639.52
Oklahoma	457,336.22	247,900.72	486,871.13
Oregon	128,866,867.46	136,540,593.13	141,176,614.05
Pennsylvania	4,613,532.38	4,923,027.09	4,165,852.54
Puerto Rico	12,915.25	17,336.63	5,404.61
South Carolina	1,507,617.12	1,701,257.06	1,144,618.96
South Dakota	3,388,926.09	2,983,000.04	2,205,259.61
Tennessee	505,505.43	511,875.21	399,876.51
Texas	3,695,331.74	3,513,039.64	2,391,730.34
Utah	1,738,582.52	1,565,081.26	1,495,377.04
Vermont	186,170.81	167,641.47	155,337.32
Virginia	667,802.45	530,885.01	525,435.84
Washington	30,886,124.04	35,103,924.21	40,808,776.04
West Virginia	1,259,065.43	1,061,686.74	1,056,967.20
Wisconsin	986,160.40	952,687.17	782,177.23
Wyoming	2,355,729.99	2,127,068.13	1,804,960.39
Total	305,785,111.59	323,841,771.93	322,782,164.62

1/ Data Source: All Service Receipts - ASR-09-3.

Table 39—State and Private Forestry funding—fiscal year 1993 compared to long-term program costs

	1993 Actual	1992 Actual	1995 RPA 1/ 1,000 constant 1993 dollars	Percent of 1993 Actual to 1995 RPA
Appropriated accounts				
Forest pest management	40,605	57,205	68,357 2/	59
Fire protection	16,885	16,618	21,362	79
Forest management and utilization	77,583	68,116	201,867	38
Special projects	21,155	20,848	NA 3/	NA 4/
Hurricane Andrew/Iniki	4,140	4,100		
Subtotal	160,368	166,887	291,586	55
Transfer accounts				
Rural community fire protection	3,500	3,500	NA	NA
Watershed and flood prevention	2,020	2,100	NA	NA
Watershed planning	303	303	NA	NA
Resource conservation and development	512	961	NA	NA
River basin surveys and investigations	850	850	NA	NA
Forestry Incentives Program 5/	1,245	1,245	NA	NA
Agricultural Conservation Program 5/	1,944	1,944	NA	NA
Subtotal	10,374	10,903	NA	NA
Total	170,742	177,790	NA	NA

1/ Information from 1990 RPA Program.

2/ Includes both cooperative and Federal pest management.

3/ - = included in forest management and utilization.

4/ NA = not available; not applicable.

5/ Includes only technical assistance allocated for the Forestry Incentives and Agricultural Conservation Programs (administered jointly by ASCS and FS).



Table 40—State and Private Forestry funding--fiscal years 1989-93

	1993	1992	1991	1990	1989
	<i>1,000 dollars actual</i>				
Appropriated accounts					
Forest pest management	40,605	57,205	60,150	47,586	49,677
Fire protection	16,885	16,618	15,749	17,078	13,851
Forest management and utilization	77,583	68,116	74,206	25,321	10,265
Special projects	21,155	20,848	32,309	19,663	12,875
Hurricane Andrew/Iniki	4,140	4,100			
Subtotal	160,368	166,887	182,414	109,648	86,668
Transfer accounts					
Rural community fire protection	3,500	3,500	3,500	3,091	3,091
Watershed and flood prevention	2,020	2,100	2,181	2,698	3,198
Watershed planning	303	303	228	228	228
Resource conservation and development	512	961	653	724	766
River basin surveys and investigations	850	850	850	852	852
Forestry Incentives Program 1/	1,245	1,245	1,245	1,245	1,245
Agricultural Conservation Program 1/	1,944	1,944	1,824	1,730	1,769
Subtotal	10,374	10,903	10,481	10,568	11,149
Total	170,742	177,790	192,895	120,216	97,817

1/ Includes only technical assistance allocated for the Forestry Incentives and Agricultural Conservation Programs (administered jointly by ASCS and FS).

Table 41—Summary of State and Private Forestry 1993 accomplishments compared to long-term program levels

	Unit of measure	1993 Actual	1993 Funded	Percent of 1993 Actual to 1993 Funded	1992 Actual	1995 1/ RPA	Percent change comparison	
							1992 Actual to 1993 Actual	1993 Actual to 1995 RPA
Appropriated accounts								
Forest pest management 3/	MM acres	561	563	100	668	NA 4/	-16	NA
Insect and disease management surveys	MM acres	3.1 5/	NA	NA	1.7	NA	82	NA
Insect and disease suppression	Projects	41	NA	NA	42	NA	-2	NA
Insect and disease special projects								
Forest management and utilization								
Forest resource management	MM acres	3.8	3.9	97	4.1	9	-7	137
Forest land management plans	M cubic feet	227	NA	NA	200	NA	14	NA
Timber harvested	M acres	1,000	NA	NA	1,100	1,300	-9	30
Reforestation 5/	M acres	294	NA	NA	257	870	14	196
Timber stand improvement 6/	M owners	190	NA	NA	153	NA	24	NA
Woodland owners assisted	MM cubic feet	-	NA	NA	NA	NA	NA	NA
Wood utilization	MM seedlings	456 7/	NA	NA	483	NA	-6	NA
Seedling, nursery, and tree improvement	Areas assisted	13,942	NA	NA	11,067	NA	26	NA
Urban forestry assistance								
Management improvement								
State forest resource planning	Person Years	28	NA	NA	28 8/	NA	0	NA
Transfer accounts								
Rural community fire protection, FmHA	M approved applications	3.5			3.5	NA	0	NA
Watershed and flood prevention, SCS 9/	Projects	30			25	NA	20	NA
Watershed planning, SCS	Plans	73			30	NA	143	NA
Resource conservation and development, SCS	Projects	48			54	NA	-11	NA
River basin surveys and investigations, SCS	Plans	53			51	NA	4	NA
Forestry Incentives Program, ASCS 10/								
Reforestation	M acres	146			150	NA	-3	NA
Timber stand improvement	M acres	28			31	NA	-10	NA
Agricultural Conservation Program, ASCS 10/								
Reforestation	M acres	103			110	NA	-6	NA
Timber stand improvement	M acres	30			38	NA	-21	NA

1/ Information from 1990 RPA Program.

2/ M = thousand, MM = million.

3/ Includes accomplishments on National Forest System and other Federal lands, as well as State and private lands.

4/ NA = not available; not applicable.

5/ Includes Conservation Reserve Program, Forestry Incentives Program and Agricultural Conservation Program accomplishments.

6/ Includes Forestry Incentives Program and Agricultural Conservation Program accomplishments.

7/ Areas represent more than one assistance per community; e.g., New York, Philadelphia, etc.

8/ Includes Emergency Watershed Protection.

9/ Accomplishments for 1993 are estimates; actual data is not available from SCS.

10/ Same as footnote 9, except for agency.

Table 42--Wildfires on State and private lands protected under the Cooperative Forestry Assistance Act (P.L. 95-313)--  
calendar year 1992

State, Commonwealth, or Territory	Acres protected <i>Number</i>	Lightening fires <i>Number</i>	Person-caused fires <i>Number</i>	Total fires <i>Number</i>	Acres burned <i>Number</i>
Alabama	25,726,491	16	4,293	4,309	36,293
Alaska	134,000,000	11	321	332	36,667
Arizona	22,447,000	80	379	459	16,058
Arkansas	18,604,989	19	1,651	1,670	20,696
California	32,057,391	683	7,289	7,972	191,708
Colorado	25,958,109	169	851	1,020	4,135
Connecticut	2,390,000	0	262	262	489
Delaware	557,000	0	13	13	37
Florida	25,380,158	568	3,756	4,324	82,226
Georgia	27,279,400	99	6,418	6,517	26,134
Guam	81,643	0	993	993	12,505
Hawaii	3,306,300	0	165	165	87,245
Idaho	6,025,690	246	202	448	13,764
Illinois	10,670,000	0	528	528	3,346
Indiana	7,328,000	0	264	264	1,435
Iowa	7,612,000	0	1,086	1,086	3,560
Kansas	46,400,000	70	2,505	2,575	52,665
Kentucky	11,663,883	3	1,294	1,297	20,574
Louisiana	18,931,000	5	2,440	2,445	27,545
Maine	17,743,000	22	739	761	4,531
Maryland	3,400,000	10	503	513	2,881
Massachusetts	3,581,000	7	4,504	4,511	5,207
Michigan	20,600,276	13	539	552	1,976
Minnesota	22,800,000	0	1,500	1,500	50,000
Mississippi	16,800,000	3	3,497	3,500	49,601
Missouri	42,350,000	100	6,374	6,474	83,650
Montana	49,679,599	235	354	589	8,057
Nebraska	49,083,520	27	848	875	19,771
Nevada	20,600,270	98	71	169	57,827
New Hampshire	4,987,200	1	379	380	347
New Jersey	3,150,000	4	1,406	1,410	16,650
New Mexico	42,500,000	115	464	579	63,069
New York	18,336,406	6	282	288	2,007
North Carolina	18,710,381	52	5,600	5,652	23,931
North Dakota	31,878,661	34	400	434	9,818
Ohio	5,822,095	4	574	578	2,878
Oklahoma	5,944,557	10	1,627	1,637	41,490
Oregon	15,536,626	630	960	1,590	21,674
Pennsylvania	19,541,000	24	840	864	1,926
Puerto Rico 1/	829,107	0	0	0	0
Rhode Island	433,000	0	102	102	81
South Carolina	12,558,258	72	5,254	5,326	31,984
South Dakota	43,556,390	205	753	958	20,367
Tennessee	25,668,400	9	2,878	2,887	25,786
Texas	22,123,000	13	1,053	1,066	13,267
Utah	15,000,000	252	247	499	34,856
Vermont	4,623,000	0	219	219	719
Virginia	13,458,062	26	1,270	1,296	3,493
Washington	12,500,000	141	932	1,073	9,943
West Virginia	12,594,000	14	745	759	7,625
Wisconsin	18,898,000	22	1,471	1,493	2,515
Wyoming	29,108,929	203	669	872	33,727
Total	1,050,813,791	4,321	81,764	86,085	1,288,736

1/ No data received



Table 43—Summary of forest stewardship program accomplishments by State—fiscal years 1992-1993

State or territory 1/	1993		1992		Cumulative plans 2/	Cumulative acres
	Plans	Acres	Plans 2/	Acres		
Alabama	202	49,893	290	24,359	869	103,462
Alaska	22	325,627	1	176,086	23	501,713
Arizona	22	8,424	17	84,293	43	220,410
Arkansas	183	50,152	100	87,000	303	144,318
California	98	84,284	108	35,690	206	119,974
Colorado	555	56,679	423	84,490	1,105	224,627
Connecticut	45	5,425	22	5,003	67	5,003
Delaware	56	5,829	12	581	100	4,331
Florida	123	66,068	92	46,660	267	179,728
Georgia	368	132,788	220	85,458	636	284,495
Guam	21	6	0	0	21	6
Hawaii	11	690	0	0	11	690
Idaho	165	11,587	150	10,500	708	46,806
Illinois	938	30,781	996	45,294	3,058	148,987
Indiana	2,487	99,964	1,076	15,462	6,332	216,126
Iowa	881	31,547	1,246	27,314	2,945	79,461
Kansas	120	14,163	307	6,966	522	23,565
Kentucky	1,058	117,771	895	90,345	3,198	314,337
Louisiana	110	12,723	68	9,328	187	22,541
Maine	231	23,541	357	27,818	930	92,681
Maryland	498	24,353	526	31,090	1,308	68,556
Massachusetts	345	38,264	76	4,515	1,116	105,835
Michigan	374	47,380	15	1,444	444	54,971
Minnesota	1,112	99,937	1,640	96,850	4,106	325,028
Mississippi	143	28,956	102	15,903	379	80,030
Missouri	243	35,951	177	25,519	1,043	122,377
Montana	134	158,400	75	21,000	226	182,200
Nebraska	92	6,799	86	7,267	195	14,566
Nevada	20	5,527	17	2,080	50	20,886
New Hampshire	262	55,462	265	37,615	1,070	167,080
New Jersey	49	9,039	6	828	55	9,867
New Mexico	69	138,841	43	23,807	121	170,632
New York	1,606	138,418	1,657	79,712	6,654	445,407
North Carolina	161	26,579	78	16,964	302	60,442
North Dakota	109	6,287	75	4,000	360	21,370
Ohio	1,526	82,130	1,811	40,915	5,724	207,380
Oklahoma	83	23,123	72	19,915	167	53,692
Oregon	226	33,013	199	27,624	510	83,020
Pennsylvania	212	29,620	36	2,428	248	32,048
Rhode Island	29	2,070	152	1,812	214	4,708
South Carolina	213	77,445	284	75,694	508	155,572
South Dakota	143	9,369	164	3,220	342	13,593
Tennessee	152	30,167	127	27,721	318	67,700
Texas	144	35,446	110	11,452	730	95,054
Utah	17	12,126	21	11,178	45	29,464
Vermont	243	44,630	128	14,067	586	83,748
Virginia	544	75,108	0	0	544	166,190
Washington	284	27,141	185	22,595	732	64,398
West Virginia	404	57,145	395	51,281	1,165	174,512
Wisconsin	1,839	117,848	5,898	110,184	11,231	417,567
Wyoming	130	11,129	189	21,563	667	45,542
Total	19,102	2,615,645	20,989	1,672,890	62,691	6,276,696

1/ Unlisted States had no data.

2/ Landowner forest stewardship plans.

Table 44—Summary of selected cooperative forest management and processing program activities--  
selected fiscal years — 1945-93

Fiscal year	Woodland owners assisted <i>Number</i>	Timber sale assistance-- volume marked <i>MBF 1/</i>	Loggers and processors assisted <i>Number</i>
1945	8,093	411,330	0
1950	22,828	518,566	0
1955	34,828	549,373	8,182
1960	82,188	569,178	8,099
1965	99,074	716,950	9,248
1970	115,197	1,225,520	13,620
1971	127,828	860,950	14,627
1972	274,001	955,627	5,290
1973	106,422	1,578,664	4,855
1974	117,990	907,311	5,353
1975	140,940	677,532	5,405
1976	105,184	596,599	15,318
1976 -77 (T.Q.) 2/	25,253	220,649	5,849
1977	133,619	921,171	29,101
1978	165,329	1,120,743	12,749
1979	183,585	755,103	11,393
1980	176,385	870,964	11,582
1981	164,279	683,181	18,609
1982	141,472	841,475	15,470
1983	136,265	872,125	8,717
1984	151,539	1,033,440	10,082 3/
1985	134,338	913,411	- 4/
1986	137,753	855,813	-
1987	158,353	1,225,896	-
1988	167,432	890,581	-
1989	153,855	1,242,564	-
1990	148,673	1,597,931	-
1991	153,090	1,697,861	-
1992	190,211	791,462 5/	-
1993	190,256	950,178	-

1/ MBF = thousand board feet.

2/ Transition quarter.

3/ Not all states reported.

4/ - = inadequate data due to lack of State grants in wood utilization program.

5/ Decline due to new programs that emphasize multi-resource management rather than timber harvesting.

Table 45—Summary of selected cooperative forest management and processing activities by region--  
fiscal year 1993

Assistance activity	Unit of measure 1/	Regions				
		Northern	Rocky Mountain	South- western	Inter- mountain	Pacific Southwest
Woodland owners assisted	Number	9,286	4,594	99	967	4,374
Forest management plans 2/ prepared	Number Acres	667 193,761	414 15,076	17 3,237	92 54,126	187 27,779
Reforestation:						
Planting	Acres	1,658	745	630	275	2,087
Seeding	Acres	0	10	0	4	2
Management for natural regeneration	Acres	12,040	1,713	4,747	265	2,643
Timber stand improvement	Acres	457	2,624	80	2,503	1,715
Outdoor recreation development	Acres	30	1,658	4,847	1,847	297
Wildlife habitat development	Acres	395	2,970	5,525	1,963	2,336
Forested range improvement	Acres	12,000	2,233	4,155	2,322	2,151
Timber sale assistance volume harvested	M cubic feet	5,853	17,119	312	181	2,050
Urban forestry assistance activities	Urban areas assisted	1,149	1,626	124	423	538
Referrals to consulting foresters	Number	100	224	46	12	1,101

See footnotes at end of table.



**Table 45—Summary of selected cooperative forest management and processing activities by region--  
fiscal year 1993--Continued**

Assistance activity	Unit of measure 1/	Regions				Total
		Pacific Northwest	Alaska	Southern	Northeastern Area	
Woodland owners assisted	Number	10,285	76	80,089	80,486	190,256
Forest management plans 2/ prepared	Number	1,302	18	37,806	21,933	62,436
	Acres	32,677	789	2,482,058	1,500,339	4,309,842
Reforestation:						
Planting	Acres	24,658	0	559,566	78,380	667,999
Seeding	Acres	0	0	11,239	689	11,944
Management for natural regeneration	Acres	15,220	0	50,358	24,317	111,303
Timber stand improvement	Acres	39,766	3	221,730	82,833	351,711
Outdoor recreation development	Acres	168	0	203,429	92,474	304,750
Wildlife habitat development	Acres	10,394	0	389,856	250,603	664,042
Forested range improvement	Acres	10,082	0	45,453	12,852	91,248
Timber sale assistance 3/ volume harvested	M cubic feet	16,620	0	99,855	88,028	230,018
Urban forestry assistance activities	Urban areas assisted	99	5	3,994	4,657	12,615
Referrals to consulting foresters	Number	246	0	9,984	10,812	22,525

1/ M = thousand

2/ Forest stewardship program plans and acres separately recorded in Table 47.

3/ Decline from FY 1991 due to new programs that emphasize multi-resource management rather than timber harvesting.

Table 46--Summary of selected cooperative forest management and processing activities by State--  
fiscal year 1993

State, Commonwealth, or Territory 1/	Woodland owners assisted <i>Number</i>	Reforestation assistance <i>Acres</i>	Timber stand improvement assistance <i>Acres</i>	Timber sale assistance-- harvest volume <i>1,000 cubic feet</i>	State nursery production <i>1,000 trees</i>
Alabama	18,730	68,224	71,586	0	36,900
Alaska	76	0	3	0	825
American Samoa	0	0	0	0	0
Arizona	64	4,677	27	312	234
Arkansas	1,318	23,061	1,767	888	11,537
California	4,273	4,466	1,611	2,050	1,409
Colorado	2,278	1,232	476	2,697	2,033
Comm. of N. Marianas	2	2	0	0	5
Connecticut	331	310	342	0	850
Delaware	562	2,868	619	465	1,212
Florida	2,562	43,441	3,303	458	26,717
Georgia	9,768	81,873	15,965	0	46,786
Guam	44	141	60	0	44
Hawaii	52	121	38	0	276
Idaho	7,636	1,306	237	1,679	1,902
Illinois	15,510	8,571	5,307	1,425	4,085
Indiana	3,933	7,486	9,610	1,672	5,200
Iowa	1,849	8,517	3,117	767	3,908
Kansas	456	290	149	1,468	835
Kentucky	1,691	6,181	2,664	0	7,686
Louisiana	3,521	24,769	43,824	0	37,960
Maine	6,926	2,037	4,575	5	0
Maryland	3,053	4,567	4,285	4,277	5,000
Massachusetts	1,333	5,406	556	11,668	0
Michigan	986	6,008	21,224	4,273	4,548
Minnesota	9,229	15,180	4,043	6,523	13,489
Mississippi	14,486	129,532	21,692	0	85,000
Missouri	1,518	11,258	1,758	1,695	4,900
Montana	629	12,132	207	4,144	970
Nebraska	898	293	2	28	2,692
Nevada	601	384	2,493	0	256
New Hampshire	7,530	242	1,014	312	295
New Jersey	2,426	1,345	1,924	1,369	395
New Mexico	35	700	53	0	30
New York	4,256	3,448	8,321	8,198	2,397
North Carolina	7,442	94,543	5,028	0	21,490
North Dakota	1,021	260	13	30	1,416
Ohio	4,418	2,291	4,896	2,621	4,991
Oklahoma	524	847	627	0	3,495
Oregon	9,005	32,681	35,695	4,918	11,839
Palau	3	2	6	0	30
Pennsylvania	2,453	671	983	6,216	2,166
Puerto Rico	1,200	428	359	0	223
Rhode Island	79	165	142	256	320
South Carolina	4,528	48,965	8,149	0	22,665
South Dakota	470	455	385	620	1,254
Tennessee	2,705	3,953	145	1,844	5,852
Texas	2,162	33,611	16,108	9,898	26,388
Utah	366	160	10	181	707
Vermont	2,544	2,595	3,227	10,850	250

See footnote at end of table.

**Table 46—Summary of selected cooperative forest management and processing activities by State—  
fiscal year 1993—Continued**

State, Commonwealth, or Territory 1/	Woodland owners assisted <i>Number</i>	Reforestation assistance <i>Acres</i>	Timber stand improvement assistance <i>Acres</i>	Timber sale assistance-- harvest volume <i>1,000 cubic feet</i>	State nursery production <i>1,000 trees</i>
Virginia	9,452	61,735	30,513	86,767	38,057
Washington	1,280	7,197	4,071	11,702	8,352
West Virginia	3,798	3,031	2,080	2,737	1,634
Wisconsin	7,752	17,390	4,810	22,699	18,998
Wyoming	492	198	1,612	12,306	294
Total	190,256	791,246	351,711	230,018	480,797

1/ Unlisted States have no cooperative forest management and processing activities.



**Table 47--Small watershed protection accomplishments--fiscal years 1989-93 (Watershed Protection and Flood Prevention Act of 1954) 1/**

	Unit of measure	1993	1992	1991	1990	1989
Land treatment 2/						
Forest land	Acres	38,322	15,480	26,967	10,477	8,735
Cropland	Acres	501	947	745	279	2,395
Pastureland	Acres	170	174	728	308	156
Total land treatment	Acres	38,993	16,601	28,440	11,064	11,286
Land owners assisted	Number	3,534	1,371	1,990	1,144	1,238

1/ Accomplishments are limited to activities accomplished solely by small watershed protection program funds.

2/ Reported in land use categories consistent with those reported by the Soil Conservation Service.

**Table 48--Flood prevention accomplishments--fiscal years 1989-93 (Watershed Protection and Flood Prevention Act of 1954) 1/**

	Unit of measure	1993	1992	1991	1990	1989
Land treatment 2/						
Forest land	Acres	2,196	5,680	11,700	4,457	15,349
Cropland	Acres	- 3/	-	-	970	253
Pastureland	Acres	-	-	-	188	259
Total land treatment	Acres	2,196	5,680	11,700	5,615	15,861
Land owners assisted	Number	1,452	1,853	1,920	2,116	2,091

1/ Accomplishments are limited to activities accomplished solely by small watershed protection program funds.

2/ Reported in land use categories consistent with those reported by the Soil Conservation Service.

3/ - = no accomplishments reported for FY 1992 and 1993 on cropland and pastureland.



Table 49--Research accomplishments--fiscal years 1990-93

Research Subject Area	Research Accomplishments 1/				RPA Theme Crosswalk 2/
	1993	1992	1991	1990	
Environmental Research					
Watershed management	121	164	126	112	1
Wildlife	147	190	204	121	1
Range	38	38	79	51	1
Fisheries habitat	56	34	46	27	1
Atmospheric deposition and air pollution	60	55	15	180	4
Wetlands	19				1
Tropical forestry	40				4
Monitoring	23				4
Biodiversity & threatened and endangered	83				1
Subtotal	587	481	470	491	
Insect and Disease Research					
Insect detection and evaluation	65	85	46	42	3
Insect biology	89	86	77	43	3
Insect control and management strategies	89	51	58	92	3
Disease detection and evaluation	49	63	31	37	3
Disease biology	45	30	61	68	3
Disease control and management strategies	41	39	23	55	3
Mycorrhizae	29	23	11	24	3
Wood products organisms	20	26	30	22	3
Subtotal	427	403	337	383	
Fire and Atmospheric Sciences Research					
Fire physics, chemistry and behavior	42	40	23	13	3
Fire, economics and management	4	40	45	8	3
Fire ecology and effects	29	20	32	25	3
Meteorology and climatology	20	27	31	21	3
Air resource management	6	4	20	0	3
Global change research	81	70	36	0	4
Atmospheric deposition & air pollution	23				4
Subtotal	205	201	187	67	
Forest Management Research					
Forest biology	166	195	268	90	3
Silviculture and management	208	310	200	160	2
Growth and yield	83	53	45	92	2
Genetics and tree improvement	77	92	61	65	3
Subtotal	534	650	574	407	

See footnotes at end of table.



Table 49--Research accomplishments--fiscal years 1990-93

Research Subject Area	Research Accomplishments 1/			RPA Theme Crosswalk 2/
	1993	1992	1991	1990
Inventories, Economics & Recreation Research				
Forest inventory and analysis	105	123	107	120
Forest economics	168	215	142	159
Forest recreation	75	234	86	82
Urban and community forestry	49	2	46	58
Subtotal	397	574	381	419
Products and Engineering Research				
Forest operations and engineering	58	73	50	46
Wood structural engineering	43	66	58	50
Chemistry, fiber, and fuel products	96	61	78	43
Utilization potential and processing of wood	108	108	79	99
Protection of wood in use	27	35	23	22
Recycling	34			
Subtotal	366	343	288	260
General	20			3
Grand total	2,536	2,652	2,237	2,027

1/ Research accomplishments include: books, papers in series, journal articles, proceedings, general technical reports, special reports, patents, videos, computer programs, dissertations and theses, and other similar accomplishments.

2/ RPA theme crosswalk numbers are shown to identify which areas support each of the four themes:

- 1 - Research to enhance recreation, wildlife and fisheries resources;
- 2 - Research to provide environmentally acceptable commodity production;
- 3 - Research to provide for improved scientific knowledge about natural resources; and
- 4 - Research to respond to global resource issues.

	1993 Actual	1995 RPA 1/	Percent of 1993 Actual to 1995 RPA
	<i>1,000 constant 1993 dollars</i>		
Appropriated funds			
Forest protection research	41,089	55,120	75
Resource analysis research	35,932	40,560	89
Forest management and utilization research	66,584 2/	71,760	93
Forest environment research	41,978	59,280	71
Ecosystem Research	7,500	NA 3/	NA
Research Challenge Cost-Share program	(1,000)	NA	NA
Subtotal	193,083	226,720	85
Research construction	4,910	NA	NA
Total appropriated accounts	197,993	NA	NA
Reimbursable accounts	13,713	NA	NA
Grand total	211,706	NA	NA

1/ Information from 1990 RPA Program.

2/ Actual 1993 funding for forest management plus forest products and harvesting research.

3/ NA = not available; not applicable.

Table 51--Forest Research funding--fiscal years 1989-93 1/

	1993	1992	1991	1990 2/	1989
	<i>1,000 actual dollars</i>				
Appropriated funds					
Forest protection research	41,089	40,770	38,196	34,742	33,181
Resource analysis research	35,932	33,228	29,414	27,052	25,617
Forest management research	40,887	39,216	36,562	32,216	26,972
Forest environment research	41,978	41,655	40,718	35,313	31,100
Forest products and harvesting research	25,697	25,640	22,739	21,602	20,497
Ecosystem research	7,500	0	0	0	0
Research challenge cost-share program	(1,000)	(750)	(750)	(500)	(500) 3/
Subtotal	193,083	180,509	167,629	150,925	137,367
Research construction (subtotal)	4,910	3,558	18,374	4,408	1,550
Total appropriated accounts	197,993	184,067	186,003	155,333	138,917
Reimbursable accounts (subtotal)	13,713	22,857	10,572	10,253	12,346
Grand total	211,706	206,924	196,575	165,586	151,263

1/ Budget structure was revised in fiscal year 1989 into five major budget line items. General Administration has been eliminated from individual line items. Total appropriated General Administration is included in tables 2 and 3.

2/ Post sequestration with supplemental.

3/ New account in 1989; non-add, funded within each budget line item for each fiscal year.



Table 52—Extramural research funded through Forest Service research appropriations--fiscal years 1992-93

Type of recipient	1993		1992	
	1,000 dollars	Number of grants	1,000 dollars	Number of grants
Domestic grantees				
Universities and colleges:				
Land Grant research institutions	17,406	630	22,060	765
1890 Land Grant and predominately black institutions	1,823	23	1,402	42
Other non-Land Grant institutions	5,315	204	2,929	111
Subtotal, universities and colleges	24,544	857	26,391	918
Other domestic				
Profit organizations	265	5	437	14
Nonprofit institutions and organizations	1,197	48	1,007	50
Federal, State, and local governments	557	25	605	16
Private individuals	280	28	346	39
Small business innovation research	62	3	702	10
Industrial firms	0	0	5	2
Subtotal, other domestic	2,361	109	3,102	131
Total, domestic	26,905	966	29,493	1,049
Foreign grantees				
Universities and colleges	9	1	73	8
Nonprofit institutions and organizations	50	1	21	2
Private individuals	14	4	34	5
Total, foreign grantees	73	6	128	15
Grand total	26,978	972	29,621	1,064

Table 53--Summary of Forest Service Human Resource Programs--fiscal year 1993

	Program funding	Value of work accomplished	Persons served	Percent		Work accomplished	Percent placement	Return per dollar invested
				Women	Minority			
	Million dollars	Million dollars	Number	Percent	Percent	Person years	Percent	Dollars
Youth Conservation Corps 1/	Unfunded	3.0	1,003	43	20	143	NA 2/	1.43
Job Corps 3/	81.4	23.0	8,383	16	46	3,803	68 4/	NA
Senior Community Service Employment Program 3/	26.1	42.4	5,686	39	23	2,415	17	1.62
Volunteers in the National Forests 5/	Unfunded	37.7	101,737	35	9	2,369	NA	NA
Hosted programs	Unfunded	24.9	18,536	17	36	1,426	NA	NA
Youth forest camps 6/	Unfunded	0.4	211	32	49	27	NA	NA
Total	107.5	131.4	135,556	NA	NA	10,183	NA	NA

1/ Funds were not directly appropriated for Youth Conservation Corps; the Congress earmarked not less than \$1 million to be expended from funds available to the Forest Service. We operated a \$2.1 million YCC program.

2/ NA = not available; not applicable.

3/ Statistics are for the July 1, 1992, through June 30, 1993, program year.

4/ Definition of placement was changed this year to include "cannot locate."

5/ Statistics include 1,938 Touch America Project (TAP) enrollees and 133 international volunteers.

6/ Operated as a pilot program through partnership with the National Forest Foundation.

**Table 54—Number and percent of all permanent and excepted-conditional employees by race/national origin and gender as of September 30, 1993 1/**

Race/National Origin	Women	Men	Total	Percent
American Indian/Alaskan Native	672	945	1,617	5
Asian/Pacific Islander	262	247	509	1
African American	778	693	1,471	4
Hispanic	665	1,152	1,817	5
White	11,470	18,058	29,528	85
Total	13,847	21,095	34,942 2/	100
Percent by gender	39.6	60.4		

1/ Excepted-conditional include cooperative education students and excepted appointments of persons with disabilities.

2/ The 34,942 total includes 34,588 permanent employees and 354 excepted-conditional employees.



Table 55—Number of paid employees by occupational category for selected fiscal years, as of September 30, 1993 1/

Occupation	1993	1992	1991	1990	1985
Professional	12,987	13,318	12,908	12,376	10,896
Administrative	4,684	4,663	4,409	4,211	3,340
Technical	25,165	24,812	23,302	22,020	24,007
Clerical	3,962	4,274	4,312	4,454	5,421
Other	673	828	884	914	321
Wage System	2,480	2,681	2,867	2,817	2,953
Total	49,951	50,576	48,682	46,792	46,938
Full-time equivalents (FTE's) 2/	42,798	43,427	42,221	42,342	38,524

1/ The data include permanent, summer, seasonal, cooperative education students, stay-in-school, and many other types of employees. These data do not include some Human Resource Programs (HRP) such as volunteers and the Senior Community Service Employment Program.

2/ One Full-Time Equivalent (FTE) equals 2,080 paid hours of employment. These data include emergency FTE's, which do not count against personnel ceilings.

Table 56—Number of paid employees by type of appointment for selected fiscal years, as of September 30, 1993

Type of Appointment	1993	1992	1991	1990	1985
Permanent 1/	34,588	35,425	34,861	33,781	32,924
Temporary/Excepted 2/	15,363	15,151	13,821	13,011	14,014
Total	49,951	50,576	48,682	46,792	46,938

1/ Permanent are those employees who have career or career-conditional appointments.

2/ Temporary/excepted employees are any non-permanent employees who are paid from agency funds. Includes summer, seasonal, casual firefighters, cooperative education, stay-in-school, and many other types of employees. These data do not include the Senior Community Service Employment Program employees (who are paid by the Department of Labor).

Table 57—Summary statement of receipts and obligations—fiscal years 1992-93 1/

	1993		1992		Percent change 1992 to 1993	
	Receipts	Obligations	Receipts 1,000 constant 1993 dollars	Obligations	Receipts	Obligations
National Forest programs						
Cash receipts:						
Sale of timber and use of other forest resources	491,835	0	591,407	0	-17	0
Use of National Grasslands & land utilization areas	11,743	0	22,881	0	-49	0
Timber sale area betterment (K-V) 2/	269,056	0	251,267	0	7	0
Cooperative work for others	41,134	0	52,110	0	-21	0
Brush disposal	23,849	0	30,271	0	-21	0
Miscellaneous (sales, rentals, damages, etc.) 3/	12,519	0	6,356	0	97	0
Restoration of forest lands and improvements	940	0	140	0	571	0
Golden Eagle passports	9	0	8	0	13	0
Timber salvage sales	193,747	0	171,831	0	13	0
Operation and maintenance of quarters	6,879	0	6,531	0	5	0
Gifts, donations, and bequests	1,222	0	742	0	65	0
Subtotal	1,052,933	0	1,133,544	0	-7	0
Cash receipts from NFS lands collected in conjunction with, and deposited to, accounts of other agencies	212,178	0	171,874	0	23	0
Non-cash income (roads built by timber purchasers)	64,747	0	88,880	0	-27	0
Total cash receipts	1,329,858	0	1,394,298	0	-5	0
Obligations						
Operating costs	0	2,258,770	0	2,489,270	0	-9
Capital outlay	0	294,512	0	339,238	0	-13
Total obligations	0	2,553,282	0	2,828,508	0	-10
Other Forest Service programs						
Forest Research programs:						
Forest research	0	204,651	0	212,274	0	-4
Research construction	0	92,323	0	76,228	0	21
Cooperative research work	0	2,033	0	6,468	0	-69
Gifts, donations, and bequests for forest rangeland research	6	980	7	1,046	-14	-6
Tongass Timber Supply Fund	0	84	0	76	0	11
Subtotal	6	300,071	7	296,092	-14	1

See footnotes at end of table.

Table 57--Summary statement of receipts and obligations--fiscal years 1992-93--Continued

	1993		1992		Percent change 1992 to 1993	
	Receipts	Obligations	Receipts 1,000 constant 1993 dollars	Obligations	Receipts	Obligations
State and Private Forestry programs						
State and Private Forestry cooperation	0	175,151	0	182,198	0	-4
Rural community fire protection	0	3,500	0	3,361	0	4
Flood prevention and watershed protection	0	2,239	0	2,227	0	1
Licensee programs (Woodsy Owl and Smokey Bear)	34	-591	34	119	0	-597
Forestry Incentives and other programs 4/	0	1,726	0	1,989	0	-13
Asian Gypsy Moth	0	0	0	5,210	0	-100
Subtotal	34	182,025	34	195,104	0	-7
Human Resource programs						
Job Corps	0	83,378	0	76,225	0	9
Senior Community Service Employment	0	6,724	0	19,043	0	-65
Subtotal	0	90,102	0	95,268	0	-5
Grand total, all programs	1,329,898	3,125,480	1,394,339	3,414,972	-5	-8
Cash receipts distributed to States, counties and						
Puerto Rico						
Payments to States and Puerto Rico	0	301,474	0	329,211	0	-8
Payment to Minnesota	0	1,256	0	1,255	0	0
Payments to counties (National Grasslands and Land Utilization Areas)	0	5,818	0	7,548	0	-23
Total	0	308,548	0	338,014	0	-9
Internal equipment and supply service (Working Capital)	153,005	119,762	150,070	118,362	2	1
Reimbursements for work performed for government and others included above	0	110,878	0	105,052	0	6

1/ Obligations were incurred on a "charged-as-worked" basis.

2/ K-V = Knutson-Vandenberg.

3/ Includes sale of personal property and acquisitions of lands to complete land exchanges.

4/ Includes Resource Conservation and Development, River Basins, and Pesticide Impact assessment funds transferred from Agricultural Research Service.



Table 58—Statement of receipts—fiscal years 1989-93

	1993	1992	1991	1990	1989
	<i>1,000 dollars actual</i>				
Receipts from sale and use of forest resources					
Timber and forest products					
Grazing	425,105	520,003	667,072	849,468	909,516
Land uses	10,518	10,780	11,457	10,418	10,949
Recreation	5,455	5,244	5,011	5,008	4,508
Power	49,396	46,605	43,013	41,335	38,132
Minerals	1,435	1,254	1,144	991	871
	11,669	30,402	43,947	64,116	86,838
Subtotal	503,578	614,288	771,644	971,336	1,050,814
Receipts from deposits for expenditures on National Forests					
Timber sale area betterment	269,056	251,267	197,399	206,489	241,706
Timber salvage sales	193,747	171,831	144,194	163,383	131,957
Brush disposal	23,849	30,271	40,468	47,121	54,456
Restoration of Forest Service lands and improvements	940	140	140	94	122
Cooperative work	41,134	52,110	54,575	53,648	52,557
Operation and maintenance of quarters	6,879	6,531	6,364	6,076	5,648
Gifts, donations, and bequests	1,222	742	1,887	1,749	2,090
Subtotal	536,827	512,892	445,027	478,560	488,536
Other receipts					
Miscellaneous (sales, rents, etc.)	12,360	6,202	8,695	5,438	8,505
Golden Eagle passports	9	8	6	8	-9
Sale of personal property	8	0	0	21	23
Royalties from sale of Smokey Bear and Woodsy Owl products	34	34	97	115	77
Acquisition of lands to complete land exchanges	151	154	105	13	325
Gifts, donations, and bequests for forest rangeland research	6	7	31	3	2
Subtotal	12,568	6,405	8,934	5,598	8,923

See footnotes at end of table.

Table 58--Statement of receipts--fiscal years 1989-93--Continued

	1993	1992	1991	1990	1989
	<i>1,000 dollars actual</i>				
Other income					
Estimated collections by Department of Energy for power licenses on proclaimed National Forest land	4,317	1,874	1,450	1,720	1,722
Estimated collections by Department of the Interior for mineral leases on proclaimed National Forest land 1/	207,861	170,000	110,000	131,000	100,300
Value of roads built by timber purchasers applied in lieu of cash payment for timber	64,747	88,880	104,579	104,864	106,541
Subtotal	276,925	260,754	216,029	237,584	208,563
Total	1,329,898	1,394,339	1,441,634	1,693,078	1,756,836
Other net deposits					
Monies advanced on active timber sales 2/					
Balance from previous year	173,835	209,729	238,095	260,668	253,237
Deposited current year	954,989	1,019,725	1,050,986	1,380,031	1,397,928
Transferred to other accounts	-911,239	-1,055,619	-1,079,352	-1,402,604	-1,390,497
Balance on deposit	217,585	173,835	209,729	238,095	260,668
Amounts deposited pending disposition 3/					
Balance from previous year	43,530	28,045	19,296	28,351	27,610
Deposited current year	-17,208	17,039	10,593	-6,393	9,609
Transferred to other accounts	-1,243	-1,554	-1,844	-2,662	-8,868
Balance on deposit	25,079	43,530	28,045	19,296	28,351
Subtotal	242,664	217,365	237,774	257,391	289,019
Total	1,572,562	1,611,704	1,679,408	1,950,469	2,045,855

1/ Oil production figures for FY 1988 through FY 1990 have been revised due to improved estimating methods.

2/ Timber sale deposits made by timber purchasers.

3/ Budget clearing account.

Table 59--Statement of receipts--fiscal year 1993

	National Forests	Oregon and California grant lands	National Grasslands & L.U. Areas 1/	Other	Total
	1,000 dollars				
Receipts from sale and use of forest resources					
Timber and forest products					
Grazing	416,005	8,845	255		425,105
Land uses	9,268	2	1,248		10,518
Recreation	5,282	0	173		5,455
Power	49,288	94	14		49,396
Minerals	1,426	0	9		1,435
	1,625	0	10,044		11,669
Subtotal	482,894	8,941	11,743		503,578
Receipts from deposits for expenditures on National Forests					
Timber sale area betterment	269,056				269,056
Timber salvage sales	193,747				193,747
Brush disposal	23,849				23,849
Restoration of Forest Service lands and improvements	940				940
Cooperative work	41,134				41,134
Operation and maintenance of quarters	6,879				6,879
Gifts, donations, and bequests	1,222				1,222
Subtotal	536,827				536,827
Other receipts					
Miscellaneous (sales, rents, etc.)					
Golden Eagle passports			12,368		12,368
Royalties from sale of Smokey Bear and Woodsy Owl products			9		9
Acquisition of lands to complete land exchanges			34		34
Gifts, donations, and bequests for forest rangeland research			151		151
			6		6
Subtotal			12,568		12,568

See footnotes at end of table



Table 59—Statement of receipts—fiscal year 1993--Continued

	National Forests	Oregon and California grant lands	National Grasslands & L.U. Areas 1/	Other	Total
Other income			1,000 dollars		
Estimated collections by Department of Energy for power licenses on proclaimed National Forest land	4,317				4,317
Estimated collections by Department of the Interior for mineral leases on proclaimed National Forest land	207,861				207,861
Value of roads built by timber purchasers in lieu of cash	64,747				64,747
Subtotal	276,925				276,925
Total	1,296,646	8,941	11,743	12,568	1,329,898
Other net deposits					
Monies advanced on active timber sales					
Balance from previous year	173,835				173,835
Deposited current year	954,989				954,989
Transferred to other accounts	-911,239				-911,239
Balance on deposit (subtotal)	217,585				217,585
Amounts deposited pending disposition					
Balance from previous year	43,530				43,530
Deposited current year	-17,208				-17,208
Transferred to other accounts	-1,243				-1,243
Balance on deposit (subtotal)	25,079				25,079
Total	242,664				242,664
Grand total	1,539,310	8,941	11,743	12,568	1,572,562

1/ Land utilization projects.

Table 60—Statement of obligations—fiscal year 1993 1/

	Total 2/	Work for other public agencies (reimbursables)
	1,000 dollars	
National Forest System		
Protection and management	1,029,330	52,060
Fighting forest fires	180,412 3/	15,341
Cooperative work for others	37,485	0
Cooperative law enforcement	5,910	0
Flood prevention and watershed protection	344	0
Water-Emergency Protection	2,504	0
Restoration of forest lands and improvements	459	0
Reforestation and timber stand improvement 3/	60,552	0
Timber sale betterment (K-V) 4/	213,654	0
Brush disposal	44,860	0
Timber salvage sales	169,591	0
Range betterment	4,771	0
Construction of facilities	49	0
Acquisition of lands, Forest Service	1,256	0
Acquisition of lands, Land and Water Conservation Fund	69,973	0
Construction of forest roads and trails	173,229	782
Timber purchaser roads constructed by the Forest Service	2,661	0
Restoration of roads, Federal Highway funds	5,423	0
Road construction, Mount St. Helens, highway trust	294	0
Road and trail maintenance	31,424	0
Tongass Timber Supply Fund	771	0
General Administration	302,971	0
Operation and maintenance of quarters	6,600	0
Hazardous waste management	8,976	0
Department of Transportation-Coast Guard	0	0
Resource management timber receipts	-1,637	0
Fire protection	191,845	1,907
Strawberry Valley land transfer	77	0
Emergency Pest Suppression	9,273	0
Pacific Yew	225	0
Subtotal 2/	2,553,282	70,090
Research		
Tongass Timber Supply Fund	84	0
Forest research	204,651	13,713
Construction of research facilities	92,323	12,327
Cooperative research	2,033	0
Gifts, donations, and bequests for forest and rangeland research	980	0
Subtotal 2/	300,071	26,040

See footnotes at end of table.

Table 60—Statement of obligations--fiscal year 1993--Continued

	Total 2/	Work for other public agencies (reimbursables)
	<i>1,000 dollars</i>	
State and Private Forestry		
Cooperation and general forestry assistance	175,151	6,668
Resource conservation and development	588	0
Rural community fire protection grants	3,500	0
River basins	793	0
Flood prevention and watershed planning	2,239	0
Licensee programs - Smokey Bear and Woodsy Owl	-591	0
Pesticide Impact Assessment	345	0
Subtotal 2/	182,025	6,668
Human Resource Programs		
Job Corps	83,378	1,356
Senior Community Service Employment Program	6,724	6,724
Subtotal 2/	90,102	8,080
Total 2/	3,125,480	110,878
Internal equipment and supplies service		
Working Capital Fund (subtotal)	119,762	119,762
Grand total 2/	3,245,242	230,640

1/ Obligations were incurred on a "charged-as-worked" basis.

2/ May not add due to rounding

3/ Does not include Reforestation Trust Fund.

4/ K-V = Knutson-Vandenberg Act.



Table 61—Statement of obligations—fiscal years 1989-93

	1993	1992	1991	1990	1989
<i>Million dollars actual</i>					
National Forest System	2,553.2	2,828.5	2,516.7	3,089.7	2,747.2
Forest Research	300.1	296.1	205.1	163.1	153.1
State and Private Forestry	182.0	195.1	167.4	123.3	89.5
Human Resource Programs	90.1	95.2	85.4	85.5	82.9
Working Capital Fund	119.8	118.4	113.4	114.5	118.7
Total	3,245.2	3,533.3	3,088.0	3,576.1	3,191.4

Table 62—Summary statement of values and obligations—fiscal year 1993

Item	Units 1/	Quantity	Average value per unit	Total value
				<i>Million dollars</i>
Value				
Minerals 2/				
Common variety	- 3/	-	-	50.0
Locatable	- 3/	-	-	650.0
Leasable				
Oil	BBL	10,500,000	14.00	147.0
Gas	MCF	210,000,000	2.00	420.0
Coal	Tons	90,000,000	11.67	1,050.3
Others	- 3/			250.0
Timber	MBF	5,916,000	154.60 4/	914.6
Recreation	RVD	295,473,100 5/	28.89 6/	7,121.0 6/
Wilderness and primitive areas	RVD	12,692,600	38.15	484.2
Wildlife and fish				
Recreation	AO	110,100,000	38.45	4,233.3
Commercial	Pounds	115,000,000	1.65	189.8
Range 7/	HM	8,278,941	1.27	10.5
Total value				15,520.7
Expenditures				
National Forest System				2,553.3
Forest Research				300.1
State and Private Forestry				182.0
Human Resource Programs				90.1
Working Capital Fund				119.8
Total expenditures				3,245.3
Net value, total				12,275.4
Net value, National Forest System only				12,967.4

1/ BBL = barrels; MCF = thousand cubic feet; tons = tons; MBF = thousand board feet;  
RVD = recreation visitor day; AO=activity occasion; HM=head month.

2/ Minerals data estimated.

3/ Units for common variety and locatable minerals are not standard.

4/ Actual value at time of sale.

5/ Includes wilderness, wildlife, and fish.

6/ Average value per unit and total value for M RVD's excludes recreation related M WFUD's and wilderness M RVD's.

7/ A head month is 1 month's occupancy by an adult animal. The fee for an adult sheep is 1/5 the fee for cattle.





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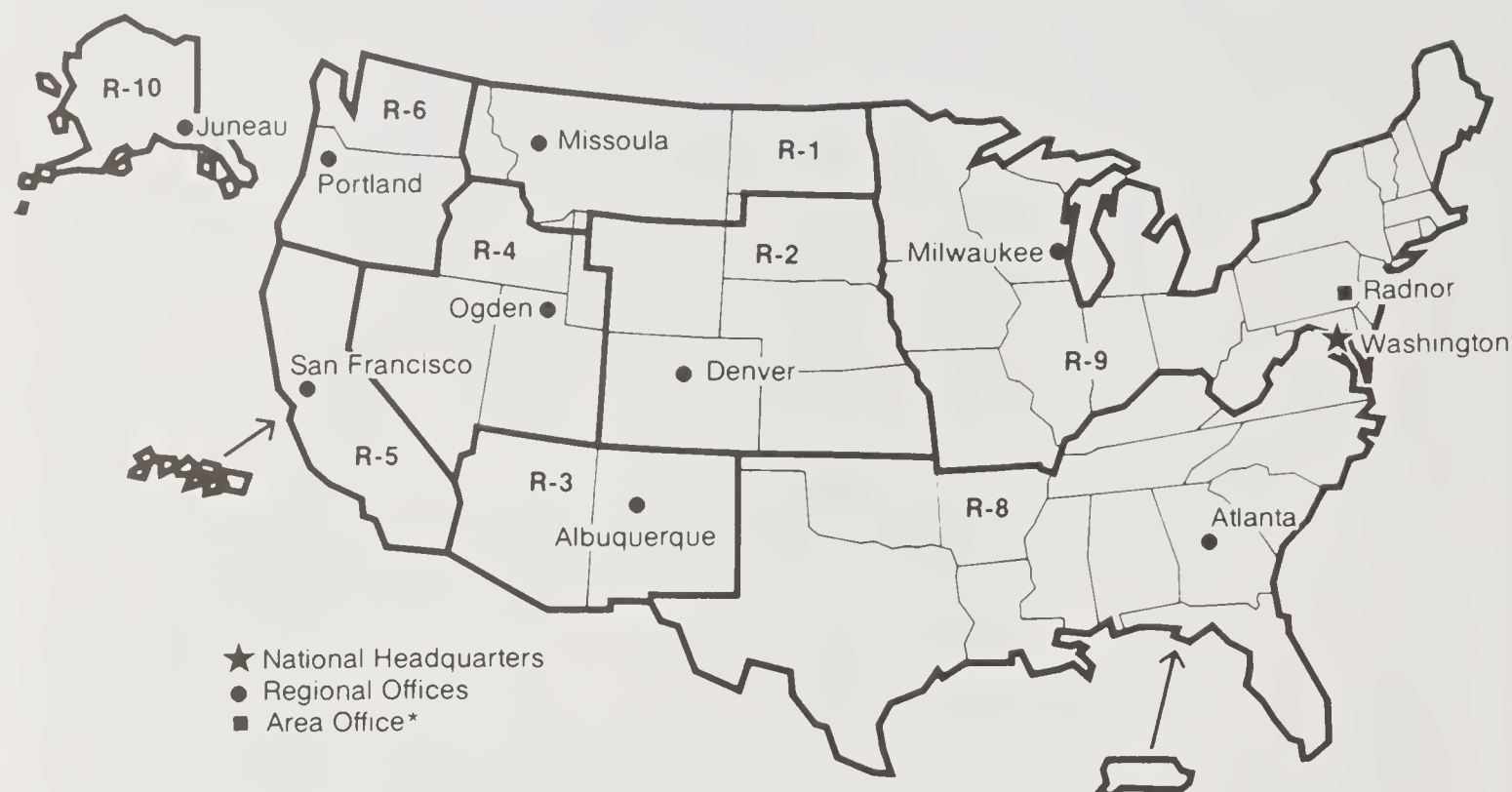
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\*In other regions, State and Private Forestry activities are directed from Regional Offices

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